

# **TECHNICAL REPORT**



**for the**

**2009 Grade 12 Fall Retest  
Mathematics, Reading, Science, and Writing**

**Provided by  
Data Recognition Corporation**

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## Glossary of Common Terms

The following table contains some terms used in this technical report and their meanings. Some of these terms are used universally in the assessment community, and some of these terms are used commonly by psychometric professionals.

**Table G–1. Glossary of Terms**

| Term                      | Common Definition                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Ability                   | In the context of scaling, a latent-trait characteristic indicating the level of an individual on a particular construct or competence in a particular area. Following Rasch literature, ability is used as a generic term for the construct that is being measured by an exam. Competence, achievement, learning and status are alternative terms that are sometimes used, but all are subject to some degree of misinterpretation.                                                                                                                                                                                                                             |
| Adjacent Agreement        | A score/rating difference of one (1) point in value usually assigned by two different raters under the same conditions (e.g., two independent raters give the same paper scores that differ by one point).                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Alternate Forms           | Two or more versions of a test that are considered exchangeable, i.e., they measure the same constructs in the same ways, are intended for the same purposes, and are administered using the same directions. More specific terminology applies depending on the degree of statistical similarity between the test forms (e.g., parallel forms, equivalent forms, and comparable forms) where parallel forms refers to the situation in which the test forms have the highest degree of similarity to each other.                                                                                                                                                |
| Average                   | A measure of central tendency in a score distribution that usually refers to the arithmetic mean of a set of scores. In this case, it is determined by adding all the scores in a distribution and then dividing the obtained value by the total number of scores. Sometimes people use the word ‘average’ to refer to other measures of central tendency such as the median (the score in the middle of a distribution) or mode (the score value with the greatest frequency).                                                                                                                                                                                  |
| Bias                      | In a statistical context, bias refers to any source of systematic error in the measurement of a test score. In discussing test fairness, bias may refer to construct-irrelevant components of test scores that differentially affect the performance of different groups of test takers (e.g., gender, ethnicity, etc.). Attempts are made to reduce bias by conducting item fairness reviews and various differential item functioning (DIF) analyses, detecting potential areas of concern, and either removing or revising the flagged test items prior to the development of the final operational form of the test. Also see Differential Item Functioning. |
| Constructed-Response Item | See open-ended item.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Content Validity Evidence | Evidence regarding the extent to which a test provides an appropriate sampling of a content domain of interest—e.g., assessable portions of a state’s Grade 6 mathematics curriculum in terms of the knowledge, skills, objectives, and processes sampled.                                                                                                                                                                                                                                                                                                                                                                                                       |

| <b>Term</b>                         | <b>Common Definition</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|-------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Core-Linking Item                   | Items that are utilized during the linking process (see Linking). They are a subset of the PSSA operational items and so they: 1) are the same on all test forms for any grade/subject area test, and 2) contribute to student total raw scores and scaled scores.                                                                                                                                                                                                                                |
| Criterion-Referenced Interpretation | When a score is interpreted as a measure of a student's performance as with respect to an expected level of mastery, educational objective, or standard. The types of resulting score interpretations provide information about what a student knows or can do in with respect to a given content area.                                                                                                                                                                                           |
| Cut Score                           | A specified point on a score scale such that scores at or above that point are interpreted or acted upon differently from scores below that point. For example, a score designated as the minimum level of performance needed to pass a competency test. One or more cut scores can be set for a test that results in dividing the score range into various proficiency level ranges. Methods for establishing cut scores vary. See Performance Level Setting.                                    |
| Decision Consistency                | The extent to which classifications based on test scores would match the decisions based on scores from a second, parallel form, of the same test. It is often expressed as the proportion of examinees that are classified the same way from the two test administrations.                                                                                                                                                                                                                       |
| Differential Item Functioning       | A statistical property of a test item in which different groups of test takers (who have the <b>same</b> total test score) have different average item scores or, in some cases, different rates of choosing various item options. Also known as DIF. Also see Bias.                                                                                                                                                                                                                              |
| Distractor                          | An incorrect option in a multiple-choice item (also called a foil).                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Equating                            | The strongest of several “linking” methods used to establish comparability between scores from multiple tests. Equated test scores should be considered exchangeable. Consequently, the criteria needed to refer to a linkage as ‘equating’ are strong and somewhat complex (equal construct and precision, equity, and invariance). In practical terms, it is often stated that it should be a ‘matter of indifference’ to a student if he/she takes any of the equated tests. See also Linking. |
| Equating Block (EB) Items           | The PSSA uses multiple test forms for each grade/subject area test. Each form is composed of operational (OP) items, equating block (EB) items, and field test (FT) items. EB items are utilized during the linking process (see Linking). Each test form includes a set of EB items. EB items are <i>not</i> part of any student scores.                                                                                                                                                         |
| Error of Measurement                | The amount by which the score actually received (an observed score) differs from a hypothetical true score. Also see Standard Error of Measurement.                                                                                                                                                                                                                                                                                                                                               |
| Exact Agreement                     | When identical scores/ratings are assigned by two different raters under the same conditions (e.g. two independent raters give a paper the same score).                                                                                                                                                                                                                                                                                                                                           |
| Field Test (FT) Items               | The PSSA uses multiple test forms for each grade/subject area test. Each form is composed of operational (OP) items, equating block (EB) items, and field test (FT) items. An FT item is a newly-developed item that is ready to be tried out to determine its statistical properties (e.g., see <i>P</i> -value and Point-Biserial Correlation). Each test form includes a set of FT items. FT items are <i>not</i> part of any student scores.                                                  |

| <b>Term</b>            | <b>Common Definition</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Frequency              | The number of times that a certain value or range of values (score interval) occurs in a distribution of scores.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Frequency Distribution | A tabulation of scores from low to high or high to low showing the number and/or percent of individuals who obtain each score or who fall within each score interval or category.                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Infit/Outfit           | Statistical indicators of the agreement of the data and the measurement model. See also Outfit/Infit.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Item Difficulty        | For the Rasch model, the dichotomous item difficulty represents the point along the latent trait continuum where an examinee has a 0.50 probability of making a correct response. For a polytomous item, the difficulty is the average of the item's step difficulties (see Step Difficulty).                                                                                                                                                                                                                                                                                                               |
| Key                    | The correct response option for an MC item.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Linking                | A generic term referring to one of a number of processes by which scores from one or more tests are made comparable <i>to some degree</i> . Linking includes several classes of transformations (equating, scale alignment, prediction, etc.). Equating is associated with the strongest degree of comparability (exchangeable scores). Other linkages may be very strong, but fail to meet one or more of the strict criteria required of equating. Also see Equating.                                                                                                                                     |
| Logit                  | The fundamental unit of measurement in the Rasch model used to express both item difficulties and person locations. When expressing person locations, logits are invariably transformed into Scaled Scores through a simple linear transformation before reporting (also see Scaled Score). When expressing item difficulties, logits are transformed <i>p</i> -value (also see <i>P</i> -value). The logit difficulty scale is inversely related to <i>p</i> -values. A higher logit value would represent a relatively harder item, while a smaller logit value would represent a relatively easier item. |
| Mean                   | Also referred to as the 'arithmetic mean' of a set of scores, is found by adding all the score values in a distribution and dividing by the total number of scores. For example, the mean of the set {66, 76, 85, and 97} is 81. The value of a mean can be influenced by extreme values in a score distribution.                                                                                                                                                                                                                                                                                           |
| Measure                | A Rasch estimate (or calibration) for a parameter, i.e., a person ability-parameter estimate, or an item difficulty-parameter estimate.                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Median                 | The middle point or score in a set of rank-ordered observations that divides the distribution into two equal parts such that each part contains 50 percent of the total data set. More simply put, half of the scores are below the median value and half of the scores are above the median value. As an example, the median for the following ranked set of scores {2, 3, 6, 8, 9} is 6.                                                                                                                                                                                                                  |
| Multiple-Choice Item   | A type of item format that requires the test taker to select a response from a group of possible choices, one of which is the correct answer (or key) to the question posed. Also see Open-Ended Item.                                                                                                                                                                                                                                                                                                                                                                                                      |

| Term             | Common Definition                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| N-count          | Sometimes designated as N or n, it is the number observations (usually individuals or students) in a particular group. Some examples include: the number of students tested, the number of students tested from a specific subpopulation (e.g., females), the number of students who attained a specific score, etc. In the follow set {23, 32, 56, 65, 78, 87}, $n = 6$ .                                                                                                                                                                                                                                                                                                                                                                                 |
| Open-ended item  | An open-ended (OE) item—referred to by some as a constructed-response (CR) item—is an item format that requires examinees to create their own responses, which can be expressed in various forms, (e.g., written paragraph, created table/graph, formulated calculation, etc.). Such items are frequently scored using more than two score categories, that is, polytomously—e.g., 0, 1, 2, and 3. This format is in contrast to when students make a choice from a supplied set of answers options—e.g., multiple-choice items (MC) which are typically dichotomously scored as right = 1 or wrong = 0. When interpreting item difficulty and discrimination indices it is important to consider whether an item is polytomously or dichotomously scored. |
| Operational Item | The PSSA uses multiple test forms for each grade/subject area test. Each form is composed of operational (OP) items, equating block (EB) items, and field test (FT) items. OP items are the same on all forms for any grade/subject area test. Student total raw scores and scaled scores are based exclusively on the OP items.                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Outfit/Infit     | Statistical indicators of the agreement of the data and the measurement model. Infit and Outfit are highly correlated, and both are highly correlated with the point-biserial correlation. <i>Underfit</i> can be caused when low-ability students correctly answer difficult items (perhaps by guessing or atypical experience) or high-ability students incorrectly answer easy items (perhaps because of carelessness or gaps in instruction). Any model expects some level of variability, so <i>overfit</i> can occur when nearly all low-ability students miss an item while nearly all high-ability students get the item correct.                                                                                                                  |
| Percent Correct  | When referring to an individual item, the “percent correct” is the item’s “ <i>p</i> -value” expressed as a percent (instead of a proportion). When referring to a total test score, it is the percentage of the total number of points that a student received. The percent correct score is obtained by dividing the student’s raw score by the total number of points possible and multiplying the result by 100. Percent Correct scores often used in criterion-referenced interpretations and are generally more helpful if the overall difficulty of a test is known. Sometimes Percent Correct scores are incorrectly interpreted as Percentile Ranks.                                                                                              |
| Percentile       | The score or point in a score distribution at or below which a given percentage of scores fall. It should be emphasized that it is a value on the score scale, not the associated percentage (although sometimes in casual usage this misinterpretation is made). For example, if 72 percent of the students score at or below a Scaled Score of 1500 on a given test, then the Scaled Score of 1500 would be considered the 72nd percentile. As another example, the median is the 50th Percentile.                                                                                                                                                                                                                                                       |

| <b>Term</b>                   | <b>Common Definition</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|-------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Percentile Rank               | The percentage of scores in a specified distribution falling at/below a certain point on a score distribution. Percentile Ranks range in value from 1 to 99, and indicate the status or relative standing of an individual within a specified group, by indicating the percent of individuals in that group who obtained equal or lower scores. An individual's percentile rank can vary depending on which group is used to determine the ranking. As suggested above, Percentiles and Percentile Rank are sometimes used interchangeably; however strictly speaking, a percentile is a value on the score scale.                                                                         |
| Performance Level Descriptors | Descriptions of an individual's competency in a particular content area, usually defined as ordered categories on a continuum, often labeled from "below basic" to "advanced," that constitute broad ranges for classifying performance. The exact labeling of these categories, and narrative descriptions, may vary from one assessment or testing program to another.                                                                                                                                                                                                                                                                                                                   |
| Performance Level Setting     | Also referred to as standard setting, a procedure used in the determination of the cut scores for a given assessment that is used to measure students' progress towards certain performance standards. Standard setting methods vary (e.g., modified Angoff, Bookmark Method, etc.), but most use a panel of educators and expert judgments to operationalize the level of achievement students must demonstrate in order to be categorized within each performance level.                                                                                                                                                                                                                 |
| Point-Biserial Correlation    | In classical test theory this is an item discrimination index. It is the correlation between a dichotomously scored item and a continuous criterion, usually represented by the total test score (or the 'corrected' total test score with the reference item removed). It reflects the extent to which an item differentiates between high-scoring and low-scoring examinees. This discrimination index ranges from $-1.00$ to $+1.00$ . The higher the discrimination index (the closer to $+1.00$ ), the better the item is considered to be performing. For multiple-choice items scored as 0 or 1, it is rare for the value of this index to exceed 0.5.                              |
| <i>P</i> -value               | An index indicating an item's difficulty for some specified group (perhaps grade). It is calculated as the proportion (sometimes percent) of students in the group who answer an item correctly. <i>P</i> -values range from 0.0 to 1.0 on the proportion scale. Lower values correspond to more difficult items and higher values correspond to easier items. <i>P</i> -values are usually provided for multiple-choice items or other items worth one point. For open-ended items or items worth more than one point, difficulty on a <i>p</i> -value-like scale can be estimated by dividing the item mean score by the maximum number of points possible for the item. Also see Logit. |
| Raw Score                     | Sometimes abbreviated by RS—it is an unadjusted score usually determined by tallying the number of questions answered correctly, or by the sum of item scores (i.e., points). (Some rarer situations might include formula-scoring, the amount of time required to perform a task, the number of errors, application of basal/ceiling rules, etc.). Raw scores typically have little or no meaning by themselves and require additional information—like the number of items on the test, the difficulty of the test items, norm-referenced information, or criterion-referenced information.                                                                                              |

| <b>Term</b>             | <b>Common Definition</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|-------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Reliability             | The expected degree to which test scores for a group of examinees are consistent over exchangeable replications of an assessment procedure, and therefore, considered dependable and repeatable for an individual examinee. A test that produces highly consistent, stable results (i.e., relatively free from random error) is said to be highly reliable. The reliability of a test is typically expressed as a reliability coefficient or by the standard error of measurement derived by that coefficient.                                                                                                                                                                                                                         |
| Reliability Coefficient | A statistical index that reflects the degree to which scores are free from random measurement error. Theoretically, it expresses the consistency of test scores as the ratio of true score variance to total score variance (true score variance plus error variance). This statistic is often expressed as correlation coefficient (e.g., correlation between two forms of a test) or with an index that resembles a correlation coefficient (e.g., calculation of a test's internal consistency using Coefficient Alpha). Expressed this way, the reliability coefficient is a “unitless” index. The higher the value of the index (closer to 1.0), the greater the reliability of the test. Also see Standard Error of Measurement. |
| Scaled Score            | A mathematical transformation of a raw score developed through a process called scaling. Scaled scores are most useful when comparing test results over time. Several different methods of scaling exist, but each is intended to provide a continuous and meaningful score scale across different forms of a test.                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Selected-Response Item  | See multiple-choice item.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Spiraling               | A packaging process used when multiple forms of a test exist and it is desired that each form be tested in all classrooms (or other grouping unit—e.g., schools) participating in the testing process. This process allows for the random distribution of test booklets to students. For example, if a package has four test forms labeled A, B, C, & D, the order of the test booklets in the package would be: A, B, C, D, A, B, C, D, A, B, C, D, etc.                                                                                                                                                                                                                                                                              |
| Standard Deviation      | SD—a statistic that measures the degree of spread or dispersion of a set of scores. The value of this statistic is always greater than or equal to zero. If all of the scores in a distribution are identical, the standard deviation is equal to zero. The further the scores are away from each other in value, the greater the standard deviation. This statistic is calculated using the information about the deviations (distances) between each score and the distribution's mean. It is equivalent to the square root of the variance statistic. The standard deviation is a commonly used method of examining a distribution's variability since the standard deviation is expressed in the same units as the data.           |



| <b>Term</b>                   | <b>Common Definition</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|-------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Standard Error of Measurement | Abbreviated SEM, it is the amount an observed score is expected to fluctuate around the true score. As an example, across replications of a measurement procedure, the true score will not differ by more than plus or minus one standard error from the observed score about 68 percent of the time (assuming normally distributed errors). The SEM is frequently used to obtain an idea of the consistency of a person’s score in actual score units, or to set a confidence band around a score in terms of the error of measurement. Often a single SEM value is calculated for all test scores. On other occasions, however, the value of the SEM can vary along a score scale. Conditional standard errors of measurement (CSEMs) provide an SEM for each possible scaled score. |
| Step Difficulty               | Step difficulty is a parameter estimate in Master’s partial credit model (PCM) that represents the relative difficulty of each score step (e.g., going from a score of 1 to a score of 2). The higher the value of a particular step difficulty, the more difficult a particular step is relative to other score steps (e.g., is it harder to go from a 1 to a 2, or to go from a 2 to a 3).                                                                                                                                                                                                                                                                                                                                                                                           |
| Strand                        | On score reports, a strand often refers to a set of items on a test measuring the same contextual area (e.g., Number Sense in Mathematics). Items developed to measure the same reporting category would be used to determine the strand score (sometimes called “subscale” score).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Technical Advisory Committee  | Or TAC—a group of individuals, most often professionals in the field of testing, that are either appointed or selected to make recommendations for and to guide the technical development of a given testing program.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Validity                      | The degree to which accumulated evidence and theory support specific interpretations of test scores entailed by the purposed uses of a test. There are various ways of gathering validity evidence.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |

## ***PSSA: The Pennsylvania System of School Assessment***

The purposes of the 2009 statewide assessment component of the Pennsylvania System of School Assessment (PSSA), as specified in the Chapter 4 Regulations, include providing:

- (1) an understanding of the students' achievement of the academic standards to students, parents, educators and community citizens,
- (2) a measure of the degree to which school programs enable students to attain the academic standards,
- (3) results to school districts, charter schools and Area Vocational Technical Schools, Intermediate Units, Private Residential Rehabilitative Institutions, Approved Private Schools, non-public and private schools for use in their strategic plans,
- (4) information to the general public and state policymakers regarding school achievement of the academic standards, and
- (5) aggregate results for all students and, in compliance with federal No Child Left Behind regulations, disaggregated results for various demographic and special needs groups.

The broad purpose of the State Assessments is to provide information to teachers and schools to guide the improvement of curricula and instructional strategies to enable students to achieve the academic standards. The areas assessed in 2009 were Mathematics and Reading at Grades 3-8 and 11, Writing at Grades 5, 8, and 11, and Science at Grades 4, 8, and 11. *The Department strongly discourages the use of this testing information for "ranking" schools.*

## ***Grade 12 Fall PSSA Retest***

Chapter 4 Regulations state that students who score at the *Proficient* or *Advanced* level on the state assessments in Mathematics, Reading, Science, and Writing administered in Grade 11 or Grade 12 are eligible to receive Certificates of *Proficiency* and/or Certificates of *Distinction*. The purpose of the Grade 12 Retest is to provide students who did not achieve a *Proficient* level or higher on the Grade 11 assessments the opportunity to improve their PSSA scores and receive certificates.

The Grade 12 Retest is not a mandatory assessment, so a student may choose not to participate without parental request for exclusion and school/district officials are not required to authorize student exclusions. PDE recommends schools that do not require student retest participation to encourage eligible students to discuss the retest with parents/guardians. Though the final decision about whether a student should participate in the retest is made by the student and his/her parents/guardians, the district must provide eligible students with the opportunity to participate.

A Grade 12 student is ELIGIBLE for the Grade 12 Retest if:

- Student achieved *Basic* or *Below Basic* performance level on that specific subject assessment, **OR**
- Student did not participate in the 2009 PSSA, **OR**
- Student's PSSA performance level is *unknown*, and attempts to determine student's performance level by contacting the student's former school *cannot confirm* that the student achieved *Proficient* or *Advanced* performance level.

A Student is NOT ELIGIBLE for the Grade 12 Retest if:

- Student achieved *Proficient* or *Advanced* performance level on that specific subject assessment, **OR**
- Student participated in the PASA, **OR**
- Student is not currently in Grade 12.

For each content area, only one test form was administered to all the eligible students. This technical report provides the retest results for PSSA Mathematics, Reading, Science, and Writing, including Item Analysis, Raw-to-Scaled Score Conversions, and Performance Levels results.

## ***Item Analysis***

### ***Multiple-Choice (MC) Items***

The most familiar indices of item performance for MC items are those that reflect item difficulty (i.e., *proportion correct*, generally referred to as a "*p-value*") and those that reflect item discrimination (often represented by the *point-biserial correlation* coefficient). The point-biserial correlation for an item is the Pearson product-moment correlation between students' item scores and their total test scores. It is expected that students who respond to the item correctly should have a higher total test score mean than students who respond incorrectly. An item that performs as expected should have a positive point-biserial correlation coefficient.

The item-level analyses done for the Grade 12 retests also included statistics for the incorrect responses (i.e., distractors) such as proportion of students selecting each distractor, and the point-biserial correlation for each distractor. The results from distractor analyses provide additional information for understanding the item's behavior. For example, the percent selecting each response is an indicator of which responses are particularly attractive.

Item level statistics for the multiple-choice items for Mathematics, Reading, Science, and Writing can be found in Appendices A, D, G, and J respectively. It should be noted that, the "-" code denotes an omitted response and the "\*" code denotes multiple marks in the appendices. As can be seen, these statistics include the number of students attempting each item, p-values, proportions of students selecting each response, item-total correlations, and point-biserial correlations for each response category. The tabled values indicate that the MC items on the PSSA retests performed as expected.

### ***Open-Ended (OE) Items***

A logical first step when evaluating OE item performance is to examine the item's score-point distribution (percentages of students in each scoring category) as this can provide a rough "snap shot" of an item's performance. For example, a four-point OE item with a vast majority of students receiving *ones* and/or *fours* with virtually no other scores occurring would be highly suspect. Another useful statistic is the correlation between the item scores and total test scores. Similar to the MC item's point-biserial index, this correlation reflects how an OE item discriminates between low scoring and high scoring students. The students with higher test scores are expected to have higher mean scores on the item.

Item level statistics for the Mathematics, Reading, Science, and Writing OE items for can be found in Appendices C, F, I, and L respectively. In the appendices, the "B" code denotes a blank non-response, the "F" code denotes a response in a foreign language, the "K" code denotes an off-task response, and the "U" code denotes an unreadable response. The score-point distributions and the item-total score correlations indicate that all the OE items performed as expected.

### ***Raw-to-Scaled Score Conversions***

A *Scaled Score*, in the simplest sense, is a transformed raw score. For the PSSA retests, this transformation was done in two steps. First, the students attempting the Grade 12 retests were scored using the Rasch scaling model by anchoring the Rasch item difficulties at the values calibrated from the 2009 spring operational data. (Appendices B, E, H, and K present the anchored Rasch item logit difficulties, their corresponding standard errors, and fit statistics for all the Mathematics, Reading, Science, and Writing MC items, respectively.) This scoring transformed student raw scores into Rasch logit scores which typically fall between -5.0 to 5.0. This transformation is non-linear and often referred to as the "Raw-to-Logit conversion." The second step is to convert these logit scores into PSSA score scales using linear transformations. Table 1 gives the linear logit-to-scaled score conversion functions for Grade 12 PSSA Mathematics, Reading, Science, and Writing. (In the table, X denotes the Rasch logit ability values).

**Table 1: Logit-to-Scaled Score Conversions**

| <b>Content</b> | <b>Transformation</b> |
|----------------|-----------------------|
| Mathematics    | $206.42X + 1203.10$   |
| Reading        | $245.45X + 1115.20$   |
| Science        | $101.81X + 1194.69$   |
| Writing        | $100.00X + 1244.30$   |

Scaled scores have several interpretive advantages over raw scores, as illustrated in the following example. A raw score of, for instance, 30 is almost meaningless unless the reader is also told how many points are possible. The same score has quite different meaning if it is based on a thirty-item test or on a sixty-item test. *Total points attained are transformed to percent correct scores to remove the effect of test length.* In the same way, a score based on sixty *difficult items* is quite different from the same score based on sixty *easy items*. *Total points attained are transformed to scaled scores to remove the effects of test length and item difficulty.*

Since 2002, a lowest obtainable scaled score (LOSS) of 700 has been implemented for most PSSA Reading, Mathematics and Writing exams. The exception is Grade 3 Reading and Mathematics, which have LOSS of 1000 and 750 respectively. For PSSA Science, the LOSS values have been set to 1050 for Grades 4 and 11, and 925 for Grade 8. Scores lower than the LOSS values are converted to the LOSS value. However, the highest obtainable scaled scores for PSSA tests are not fixed. They are allowed to float for each subject and grade. The RS-SS conversion tables for Mathematics, Reading, Science and Writing can be found in Appendices N, O, P, and Q, respectively. The students' raw scores were transformed to the scaled scores based on those tables.

## ***Summary of the Grade 12 Retest Results***

### ***Scaled Score Results***

The performance of students attempting the fall retests was compared with the performance of students attempting 2009 spring operational tests. Table 2 summarizes the spring and fall test results for these two groups of students including the mean, standard deviation (SD), maximum, and minimum scaled scores as well as the reliability of the assessments. As can be seen, the mean scaled scores on the fall retest were lower than the mean scores on the spring test, indicating that the students who took the fall retest performed less well than the students who took the previous spring test in all three content areas. These results are expected in a retest situation because the group taking the retest is typically comprised of students who have performed poorly on the previous administration.

The standard deviations were also lower for the retest group. Smaller standard deviations were the result of a more homogeneous score distribution, an artifact of the aforementioned tendency for retesters to be lower achieving students. The relatively lower test reliabilities (based on Coefficient Alpha) for Mathematics, Reading, and Science can also be attributed to the decreased variability in test scores. Reliabilities for the Writing inventory are given in the form of stratified alpha coefficients. Scorer agreement percentages for the prompt scores are provided in Appendix M. These are generally consistent with historic values.

**Table 2: Operational and Retest Summary Statistics (Scaled Score Metric)**

|                 | Mathematics |        | Reading |        | Science |        | Writing |        |
|-----------------|-------------|--------|---------|--------|---------|--------|---------|--------|
|                 | Oper.       | Retest | Oper.   | Retest | Oper.   | Retest | Oper.   | Retest |
| <b>N</b>        | 133952      | 32438  | 133753  | 24329  | 130262  | 26241  | 132866  | 8840   |
| <b>Mean</b>     | 1345.4      | 1139.0 | 1368.5  | 1132.9 | 1244.0  | 1185.0 | 1480.4  | 1173.7 |
| <b>St. Dev.</b> | 259.9       | 162.1  | 280.8   | 205.6  | 101.5   | 78.0   | 283.7   | 207.8  |
| <b>Min</b>      | 700         | 700    | 700     | 700    | 1050    | 1050   | 700     | 700    |
| <b>Max</b>      | 2347        | 1948   | 2524    | 2524   | 1732    | 1527   | 2257    | 2257   |
| <b>Reli.</b>    | 0.94        | 0.89   | 0.90    | 0.85   | 0.92    | 0.88   | 0.80    | 0.80   |

Figures 1, 2, 3, and 4 contrast the fall retest frequency distributions against the spring operational frequency distributions for Mathematics, Reading, Science, and Writing test scores, respectively. As seen from Figures 1, 2, and 3, the distributions of scaled scores for the fall Mathematics

Reading, and Science retests are positively-skewed relative to their operational counterparts with lower test scores occurring with much greater frequency than higher scores. In contrast, the spring operational test scores are more negatively distributed. As shown in Figure 4, both the operational and fall distributions for Writing have a ‘roller-coaster’ pattern with a major mode and several minor modes. This pattern likely results from the weighting given to the writing prompts in scoring. This is described in the Spring PSSA Technical Report.

**Figure 1: Mathematics Operational and Retest Scaled Score Frequency Distributions**

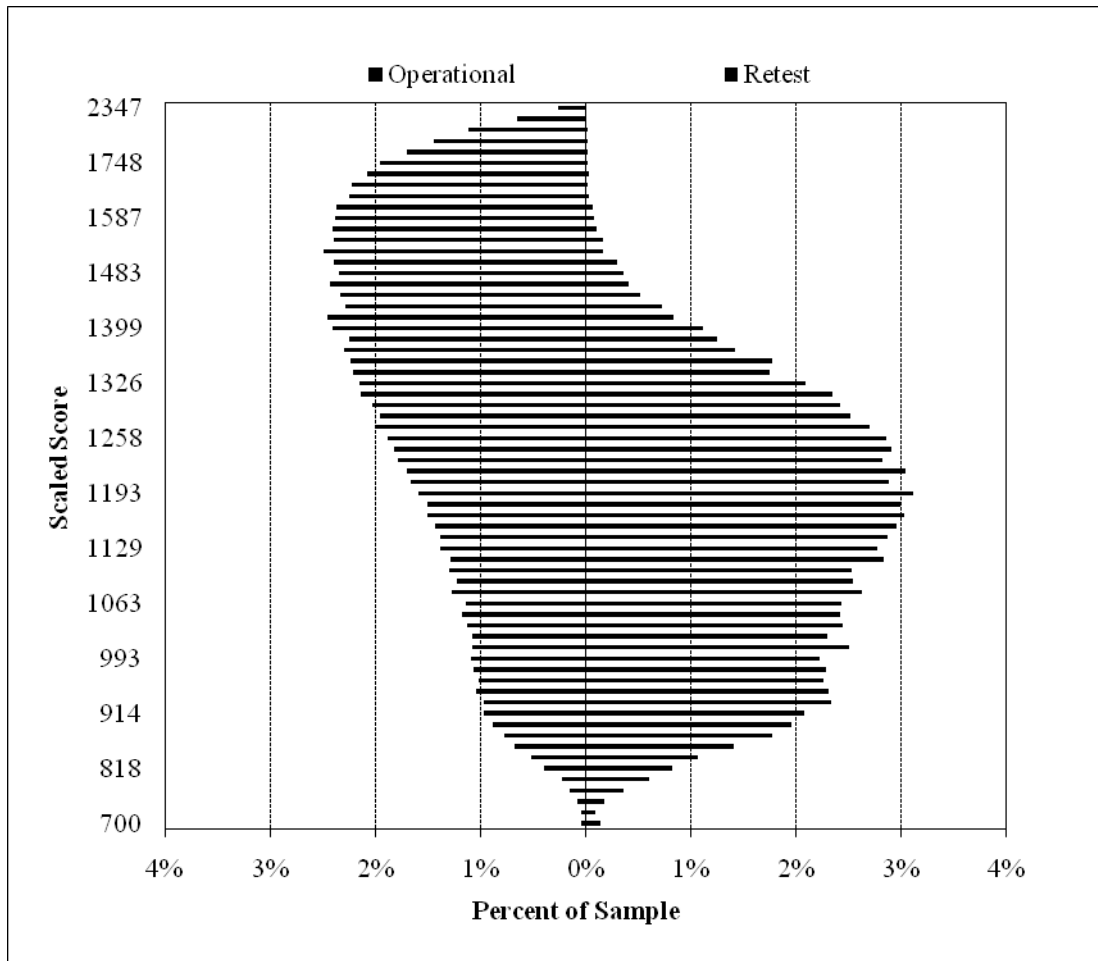


Figure 2: Reading Operational and Retest Scaled Score Frequency Distribution

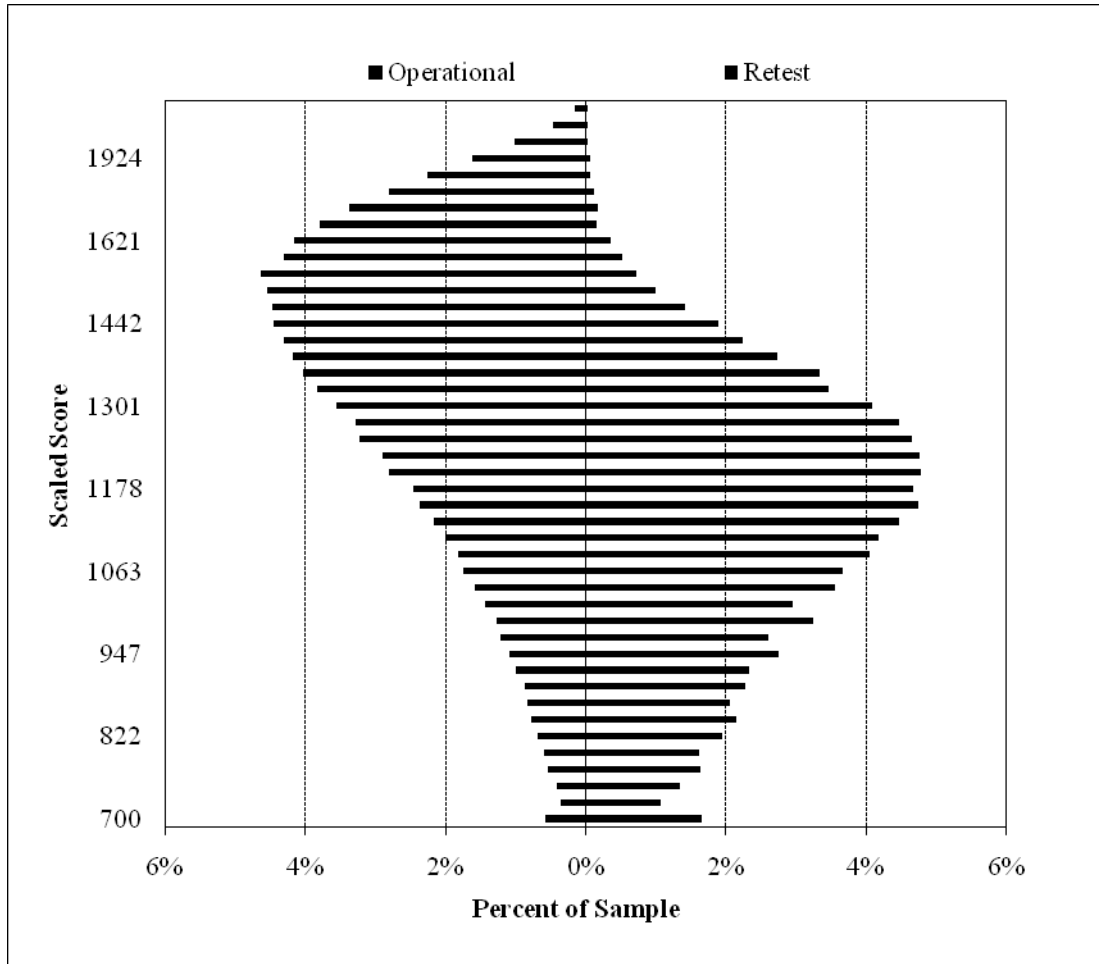


Figure 3: Science Operational and Retest Scaled Score Frequency Distribution

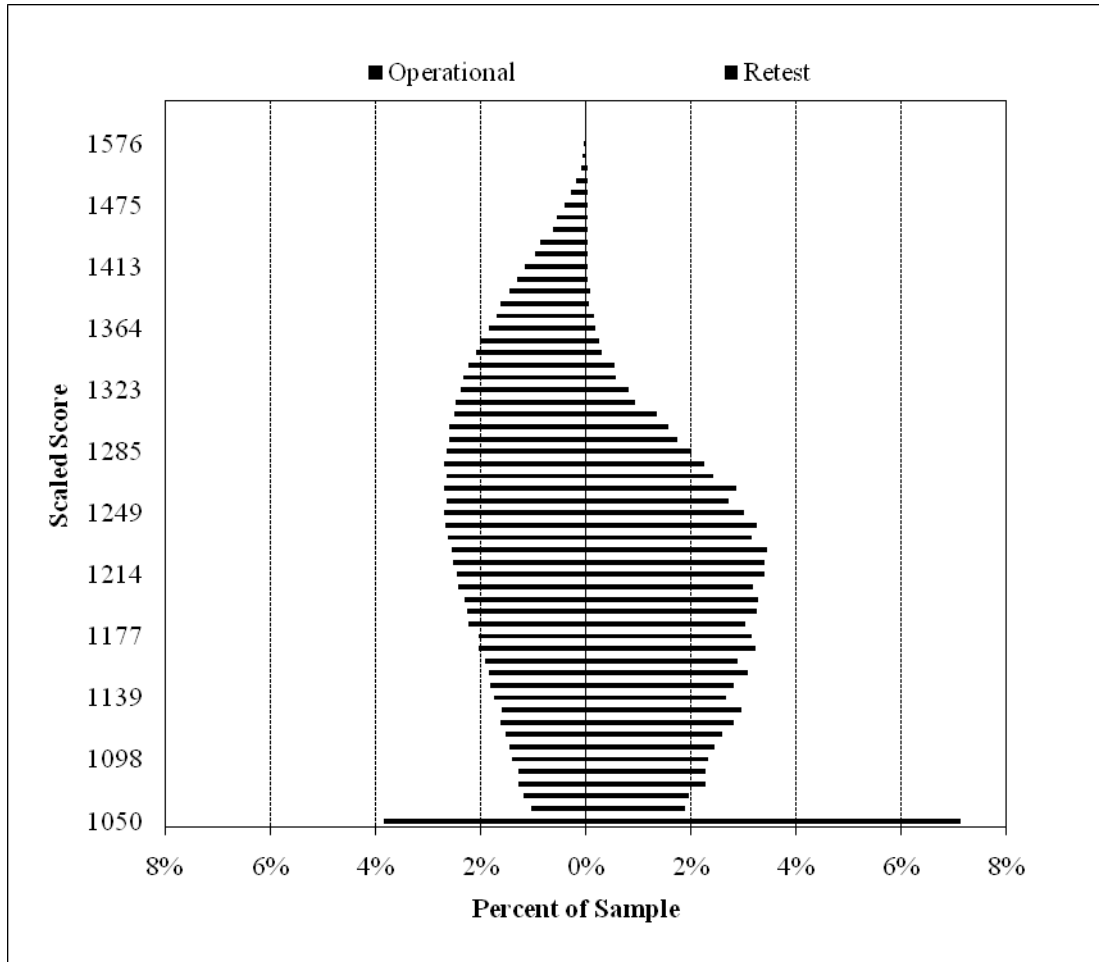
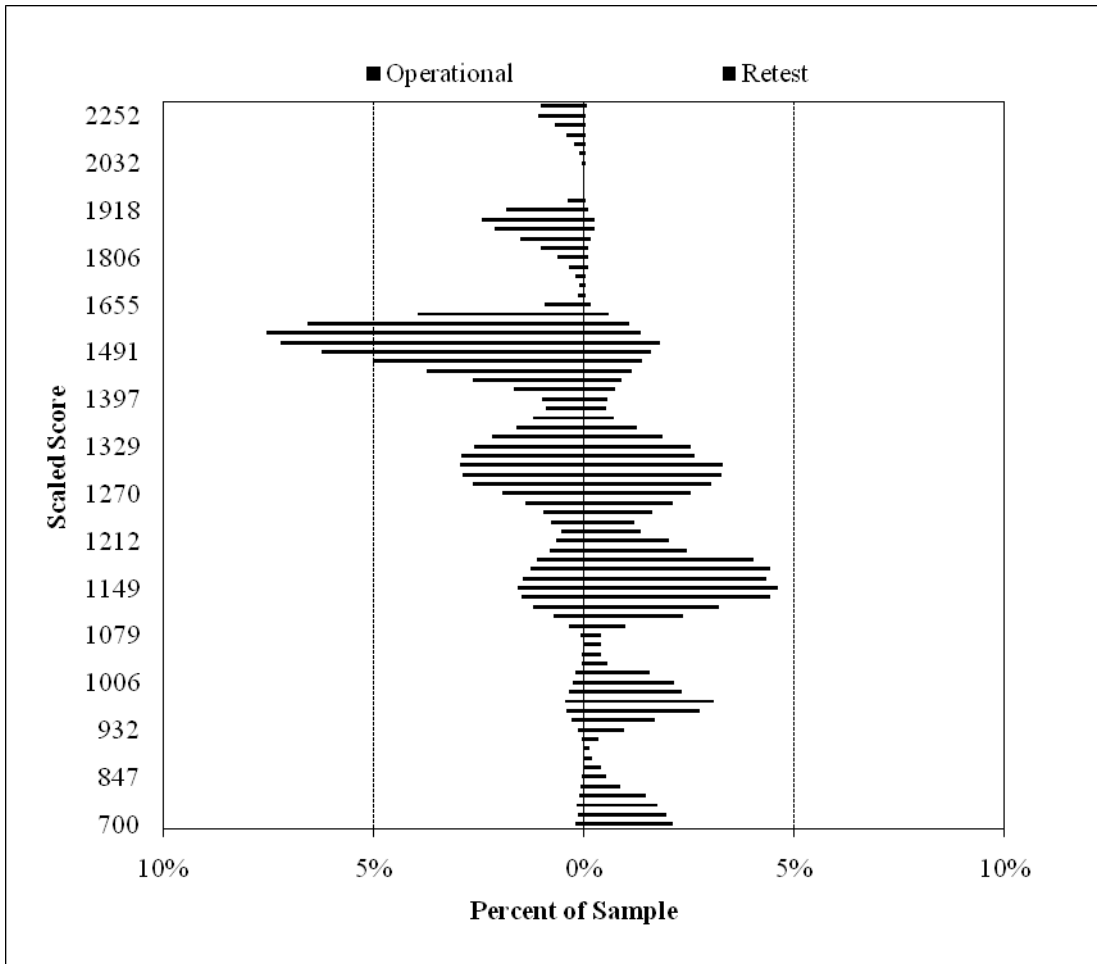




Figure 4: Writing Operational and Retest Scaled Score Frequency Distribution



**Performance Level Results**

A temperature of 37 degrees does not provide useful information unless the scale is anchored to some known point. In this example, some useful anchors might be the freezing point of water or perhaps the normal body temperature of humans. In order for scaled scores to be meaningful to users, they must be related to some sort of performance standards. The Commonwealth of Pennsylvania has developed four general Performance Level Descriptors, which are described in Table 3.

**Table 3: Performance Level Descriptors**

| <b>Level</b>       | <b>Description</b>                                                                                                                                                                                                                                                                                                                                                                                            |
|--------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Advanced</b>    | The Advanced Level reflects superior academic performance. Advanced work indicates an in-depth understanding and exemplary display of the skills included in the Pennsylvania Academic Content Standards.                                                                                                                                                                                                     |
| <b>Proficient</b>  | The Proficient Level reflects satisfactory academic performance. Proficient work indicates a solid understanding and adequate display of the skills included in the Pennsylvania Academic Content Standards.                                                                                                                                                                                                  |
| <b>Basic</b>       | The Basic Level reflects marginal academic performance. Basic work indicates a partial understanding and limited display of the skills in the Pennsylvania Academic Content Standards. This work is approaching satisfactory performance but has not yet reached it. There is a need for additional instructional opportunities and/or increased student academic commitment to achieve the Proficient Level. |
| <b>Below Basic</b> | The Below Basic Level reflects inadequate academic performance. Below Basic work indicates little understanding and minimal display of the skills included in the Pennsylvania Academic Content Standards. There is a major need for additional instructional opportunities and/or increased student academic commitment to achieve the Proficient Level.                                                     |

The scores that correspond with each performance level are located in Table 4. The cumulative percentage of students who achieved a *Proficient* or *Advanced* performance level on the Mathematics, Reading, Science, and Writing retests are 15.6, 26.8, 13.0, and 34.9, respectively. Approximately 65%-85% of the students who took the retest still scored in the *Basic* or *Below Basic* levels for each subject level.

**Table 4: Grade 12 Retest Performance Standards**

| <b>Mathematics</b>       |                     |                  |                |
|--------------------------|---------------------|------------------|----------------|
| <b>Performance Level</b> | <b>Scaled Score</b> | <b>Frequency</b> | <b>Percent</b> |
| <b>Advanced</b>          | 1509 and up         | 236              | 0.7            |
| <b>Proficient</b>        | 1304-1508           | 4828             | 14.9           |
| <b>Basic</b>             | 1167-1303           | 10146            | 31.3           |
| <b>Below Basic</b>       | 1166 and below      | 17228            | 53.1           |

| <b>Reading</b>           |                     |                  |                |
|--------------------------|---------------------|------------------|----------------|
| <b>Performance Level</b> | <b>Scaled Score</b> | <b>Frequency</b> | <b>Percent</b> |
| <b>Advanced</b>          | 1492 and up         | 781              | 3.2            |
| <b>Proficient</b>        | 1257-1491           | 5750             | 23.6           |
| <b>Basic</b>             | 1112-1256           | 6833             | 28.1           |
| <b>Below Basic</b>       | 1111 and below      | 10965            | 45.1           |

| <b>Science</b>           |                     |                  |                |
|--------------------------|---------------------|------------------|----------------|
| <b>Performance Level</b> | <b>Scaled Score</b> | <b>Frequency</b> | <b>Percent</b> |
| <b>Advanced</b>          | 1347 and up         | 324              | 1.2            |
| <b>Proficient</b>        | 1275-1346           | 3100             | 11.8           |
| <b>Basic</b>             | 1150-1274           | 13856            | 52.8           |
| <b>Below Basic</b>       | 1149 and below      | 8961             | 34.1           |

| <b>Writing</b>           |                     |                  |                |
|--------------------------|---------------------|------------------|----------------|
| <b>Performance Level</b> | <b>Scaled Score</b> | <b>Frequency</b> | <b>Percent</b> |
| <b>Advanced</b>          | 1806 and up         | 64               | 0.7            |
| <b>Proficient</b>        | 1236-1805           | 3021             | 34.2           |
| <b>Basic</b>             | 952-1235            | 4606             | 52.1           |
| <b>Below Basic</b>       | 951 and below       | 1149             | 13.0           |

Of the students with scores for both the spring operational and the fall retest administrations, 63.2% of the students remained at the same performance level in Mathematics, while 23.8% transitioned to a higher level and 13.0% regressed to a lower level. (Numbers may not add to 100% exactly due to rounding.) For Reading, 51.1% of the students stayed at the same level, 36.4% improved and 12.5% regressed. For Science, 67.8% of the students stayed at the same level, 19.4% improved and 12.8% regressed. For Writing, 55.9% of the students remained at the same level, 35.0% improved and 9.1% regressed.

**Appendix A: 2009 Grade 12 Fall Mathematics Retest  
Multiple-Choice Item Statistics**

| Item Description |     |       | Proportions |       |       |       |       |       |       | Point Biserials |        |        |        |        |
|------------------|-----|-------|-------------|-------|-------|-------|-------|-------|-------|-----------------|--------|--------|--------|--------|
| Seq.             | Key | N     | P-Value     | A     | B     | C     | D     | -     | *     | Tot. Corr.      | A      | B      | C      | D      |
| 1                | D   | 33210 | 0.325       | 0.201 | 0.332 | 0.139 | 0.325 | 0.002 | 0.000 | 0.237           | -0.259 | -0.296 | -0.117 | 0.237  |
| 2                | B   | 33210 | 0.470       | 0.248 | 0.470 | 0.175 | 0.104 | 0.002 | 0.000 | 0.173           | -0.044 | 0.173  | -0.268 | -0.197 |
| 3                | C   | 33210 | 0.845       | 0.013 | 0.047 | 0.845 | 0.094 | 0.001 | 0.000 | 0.276           | -0.160 | -0.151 | 0.276  | -0.224 |
| 4                | A   | 33210 | 0.462       | 0.462 | 0.242 | 0.145 | 0.149 | 0.001 | 0.000 | 0.296           | 0.296  | -0.219 | -0.348 | -0.268 |
| 5                | B   | 33210 | 0.651       | 0.106 | 0.651 | 0.151 | 0.090 | 0.002 | 0.000 | 0.390           | -0.345 | 0.390  | -0.359 | -0.170 |
| 6                | B   | 33210 | 0.228       | 0.252 | 0.228 | 0.233 | 0.282 | 0.005 | 0.000 | 0.111           | -0.094 | 0.111  | -0.171 | -0.122 |
| 7                | D   | 33210 | 0.496       | 0.095 | 0.331 | 0.075 | 0.496 | 0.002 | 0.000 | 0.402           | -0.297 | -0.382 | -0.347 | 0.402  |
| 8                | B   | 33210 | 0.526       | 0.186 | 0.526 | 0.171 | 0.115 | 0.002 | 0.000 | 0.286           | -0.284 | 0.286  | -0.215 | -0.221 |
| 9                | B   | 33210 | 0.470       | 0.110 | 0.470 | 0.289 | 0.125 | 0.005 | 0.000 | 0.197           | -0.350 | 0.197  | -0.075 | -0.192 |
| 10               | A   | 33210 | 0.802       | 0.802 | 0.060 | 0.086 | 0.051 | 0.001 | 0.000 | 0.459           | 0.459  | -0.330 | -0.347 | -0.269 |
| 11               | D   | 33210 | 0.487       | 0.136 | 0.155 | 0.220 | 0.487 | 0.003 | 0.000 | 0.381           | -0.271 | -0.359 | -0.372 | 0.381  |
| 12               | C   | 33210 | 0.327       | 0.105 | 0.320 | 0.327 | 0.241 | 0.007 | 0.000 | 0.150           | -0.174 | -0.149 | 0.150  | -0.159 |
| 13               | D   | 33210 | 0.384       | 0.188 | 0.145 | 0.279 | 0.384 | 0.004 | 0.001 | 0.258           | -0.290 | -0.270 | -0.210 | 0.258  |
| 14               | B   | 33210 | 0.553       | 0.166 | 0.553 | 0.178 | 0.102 | 0.001 | 0.000 | 0.447           | -0.314 | 0.447  | -0.363 | -0.498 |
| 15               | C   | 33210 | 0.503       | 0.168 | 0.198 | 0.503 | 0.124 | 0.007 | 0.000 | 0.277           | -0.249 | -0.299 | 0.277  | -0.150 |
| 16               | C   | 33210 | 0.560       | 0.087 | 0.131 | 0.560 | 0.220 | 0.001 | 0.000 | 0.368           | -0.347 | -0.240 | 0.368  | -0.339 |
| 17               | A   | 33210 | 0.482       | 0.482 | 0.190 | 0.167 | 0.157 | 0.003 | 0.000 | 0.285           | 0.285  | -0.231 | -0.282 | -0.259 |
| 18               | A   | 33210 | 0.324       | 0.324 | 0.051 | 0.516 | 0.106 | 0.002 | 0.000 | 0.172           | 0.172  | -0.338 | -0.119 | -0.274 |
| 19               | B   | 33210 | 0.571       | 0.111 | 0.571 | 0.118 | 0.195 | 0.005 | 0.000 | 0.331           | -0.259 | 0.331  | -0.326 | -0.243 |
| 20               | B   | 33210 | 0.529       | 0.330 | 0.529 | 0.087 | 0.049 | 0.004 | 0.000 | 0.093           | 0.018  | 0.093  | -0.266 | -0.160 |
| 21               | A   | 33210 | 0.702       | 0.702 | 0.046 | 0.222 | 0.029 | 0.002 | 0.000 | 0.475           | 0.475  | -0.309 | -0.432 | -0.243 |
| 22               | C   | 33210 | 0.487       | 0.218 | 0.128 | 0.487 | 0.160 | 0.006 | 0.000 | 0.235           | -0.166 | -0.286 | 0.235  | -0.189 |
| 25               | C   | 33210 | 0.469       | 0.174 | 0.270 | 0.469 | 0.083 | 0.003 | 0.000 | 0.225           | -0.331 | -0.180 | 0.225  | -0.037 |
| 26               | B   | 33210 | 0.544       | 0.097 | 0.544 | 0.237 | 0.119 | 0.003 | 0.000 | 0.425           | -0.274 | 0.425  | -0.401 | -0.360 |
| 27               | B   | 33210 | 0.558       | 0.319 | 0.558 | 0.065 | 0.056 | 0.001 | 0.000 | 0.412           | -0.376 | 0.412  | -0.261 | -0.368 |
| 28               | D   | 33210 | 0.525       | 0.301 | 0.074 | 0.098 | 0.525 | 0.001 | 0.000 | 0.334           | -0.209 | -0.392 | -0.391 | 0.334  |
| 29               | D   | 33210 | 0.417       | 0.226 | 0.151 | 0.202 | 0.417 | 0.004 | 0.000 | 0.275           | -0.180 | -0.373 | -0.268 | 0.275  |
| 30               | C   | 33210 | 0.526       | 0.109 | 0.172 | 0.526 | 0.186 | 0.006 | 0.000 | 0.230           | -0.212 | -0.255 | 0.230  | -0.129 |
| 31               | B   | 33210 | 0.451       | 0.230 | 0.451 | 0.213 | 0.103 | 0.003 | 0.000 | 0.161           | -0.172 | 0.161  | -0.126 | -0.131 |
| 32               | D   | 33210 | 0.611       | 0.121 | 0.161 | 0.105 | 0.611 | 0.002 | 0.000 | 0.411           | -0.408 | -0.241 | -0.374 | 0.411  |
| 33               | B   | 33210 | 0.542       | 0.183 | 0.542 | 0.179 | 0.092 | 0.003 | 0.000 | 0.278           | -0.261 | 0.278  | -0.231 | -0.195 |
| 34               | A   | 33210 | 0.689       | 0.689 | 0.070 | 0.078 | 0.159 | 0.002 | 0.001 | 0.394           | 0.394  | -0.345 | -0.375 | -0.223 |
| 35               | A   | 33210 | 0.312       | 0.312 | 0.133 | 0.230 | 0.322 | 0.003 | 0.000 | 0.194           | 0.194  | -0.257 | -0.181 | -0.198 |
| 36               | B   | 33210 | 0.455       | 0.087 | 0.455 | 0.339 | 0.113 | 0.004 | 0.001 | 0.283           | -0.205 | 0.283  | -0.295 | -0.187 |

**2009 PSSA Grade 12 Retest Technical Report for Mathematics, Reading, Science, and Writing**

| Item Description |     |       | Proportions |       |       |       |       |       |       | Point Biserials |        |        |        |        |
|------------------|-----|-------|-------------|-------|-------|-------|-------|-------|-------|-----------------|--------|--------|--------|--------|
| Seq.             | Key | N     | P-Value     | A     | B     | C     | D     | -     | *     | Tot. Corr.      | A      | B      | C      | D      |
| 37               | D   | 33210 | 0.534       | 0.093 | 0.063 | 0.306 | 0.534 | 0.003 | 0.001 | 0.363           | -0.325 | -0.396 | -0.285 | 0.363  |
| 38               | D   | 33210 | 0.457       | 0.124 | 0.225 | 0.188 | 0.457 | 0.006 | 0.000 | 0.311           | -0.186 | -0.335 | -0.298 | 0.311  |
| 39               | A   | 33210 | 0.521       | 0.521 | 0.147 | 0.146 | 0.182 | 0.003 | 0.000 | 0.358           | 0.358  | -0.234 | -0.413 | -0.285 |
| 40               | B   | 33210 | 0.578       | 0.142 | 0.578 | 0.173 | 0.101 | 0.005 | 0.000 | 0.203           | -0.138 | 0.203  | -0.181 | -0.174 |
| 41               | A   | 33210 | 0.560       | 0.560 | 0.186 | 0.143 | 0.108 | 0.004 | 0.000 | 0.304           | 0.304  | -0.250 | -0.250 | -0.248 |
| 42               | C   | 33210 | 0.493       | 0.107 | 0.316 | 0.493 | 0.077 | 0.006 | 0.000 | 0.283           | -0.201 | -0.257 | 0.283  | -0.266 |
| 43               | A   | 33210 | 0.320       | 0.320 | 0.239 | 0.266 | 0.168 | 0.006 | 0.000 | 0.219           | 0.219  | -0.216 | -0.216 | -0.240 |
| 44               | A   | 33210 | 0.415       | 0.415 | 0.327 | 0.164 | 0.088 | 0.005 | 0.000 | 0.318           | 0.318  | -0.289 | -0.312 | -0.293 |
| 45               | C   | 33210 | 0.479       | 0.317 | 0.126 | 0.479 | 0.074 | 0.005 | 0.001 | 0.245           | -0.132 | -0.323 | 0.245  | -0.292 |
| 46               | D   | 33210 | 0.441       | 0.136 | 0.178 | 0.234 | 0.441 | 0.010 | 0.001 | 0.273           | -0.258 | -0.248 | -0.245 | 0.273  |
| 47               | D   | 33210 | 0.274       | 0.221 | 0.312 | 0.183 | 0.274 | 0.009 | 0.000 | 0.143           | -0.138 | -0.136 | -0.209 | 0.143  |
| 48               | A   | 33210 | 0.599       | 0.599 | 0.131 | 0.130 | 0.133 | 0.006 | 0.000 | 0.468           | 0.468  | -0.363 | -0.404 | -0.362 |
| 49               | D   | 33210 | 0.592       | 0.144 | 0.150 | 0.108 | 0.592 | 0.005 | 0.000 | 0.472           | -0.427 | -0.375 | -0.352 | 0.472  |
| 50               | A   | 33210 | 0.416       | 0.416 | 0.230 | 0.211 | 0.136 | 0.006 | 0.000 | 0.347           | 0.347  | -0.339 | -0.342 | -0.294 |
| 51               | B   | 33210 | 0.321       | 0.042 | 0.321 | 0.282 | 0.349 | 0.006 | 0.000 | 0.250           | -0.416 | 0.250  | -0.324 | -0.168 |
| 52               | C   | 33210 | 0.768       | 0.073 | 0.093 | 0.768 | 0.059 | 0.006 | 0.000 | 0.434           | -0.288 | -0.344 | 0.434  | -0.270 |
| 53               | D   | 33210 | 0.674       | 0.071 | 0.131 | 0.118 | 0.674 | 0.006 | 0.001 | 0.502           | -0.345 | -0.403 | -0.394 | 0.502  |
| 54               | C   | 33210 | 0.640       | 0.095 | 0.118 | 0.640 | 0.141 | 0.005 | 0.001 | 0.326           | -0.302 | -0.247 | 0.326  | -0.205 |
| 55               | C   | 33210 | 0.659       | 0.121 | 0.152 | 0.659 | 0.061 | 0.007 | 0.000 | 0.436           | -0.354 | -0.336 | 0.436  | -0.290 |
| 56               | B   | 33210 | 0.554       | 0.268 | 0.554 | 0.099 | 0.072 | 0.006 | 0.000 | 0.349           | -0.201 | 0.349  | -0.424 | -0.347 |

NOTE: "-" denotes omits; "\*" denotes multiple marks.

**Appendix B: 2009 Grade 12 Fall Mathematics Retest  
Multiple-Choice Rasch Item Statistics**

| Seq. | Anchored Measure | Measure SE | InFit |      | OutFit |      |
|------|------------------|------------|-------|------|--------|------|
|      |                  |            | MS    | ZSTD | MS     | ZSTD |
| 1    | 0.6595           | 0.0128     | 1.10  | 9.9  | 1.16   | 9.9  |
| 2    | 0.3744           | 0.0123     | 1.08  | 9.9  | 1.12   | 9.9  |
| 3    | -0.2082          | 0.0119     | 1.05  | 9.9  | 1.06   | 9.9  |
| 4    | -0.1433          | 0.0119     | 1.05  | 9.9  | 1.06   | 9.9  |
| 5    | -0.9500          | 0.0123     | 0.92  | -9.9 | 0.90   | -9.9 |
| 6    | -0.6089          | 0.0120     | 0.96  | -9.9 | 0.95   | -9.9 |
| 7    | 0.4570           | 0.0125     | 1.12  | 9.9  | 1.17   | 9.9  |
| 8    | -0.7451          | 0.0121     | 0.89  | -9.9 | 0.87   | -9.9 |
| 9    | -0.2102          | 0.0119     | 1.08  | 9.9  | 1.10   | 9.9  |
| 10   | 0.2105           | 0.0121     | 1.01  | 2.9  | 1.02   | 3.3  |
| 11   | -0.9262          | 0.0123     | 0.88  | -9.9 | 0.85   | -9.9 |
| 12   | -0.5885          | 0.0119     | 0.99  | -2.2 | 0.99   | -2.8 |
| 13   | 1.0817           | 0.0140     | 1.03  | 3.8  | 1.11   | 9.9  |
| 14   | -0.2827          | 0.0119     | 1.07  | 9.9  | 1.09   | 9.9  |
| 15   | 0.1357           | 0.0121     | 1.02  | 4.0  | 1.03   | 4.8  |
| 16   | -0.3398          | 0.0119     | 0.97  | -7.8 | 0.97   | -7.2 |
| 17   | -0.2196          | 0.0119     | 1.04  | 9.9  | 1.05   | 9.9  |
| 18   | 0.0679           | 0.0120     | 0.95  | -9.9 | 0.94   | -9.9 |
| 19   | -0.8524          | 0.0122     | 0.93  | -9.9 | 0.92   | -9.9 |
| 20   | -0.4134          | 0.0119     | 0.96  | -9.9 | 0.95   | -9.9 |
| 21   | -1.3058          | 0.0129     | 0.86  | -9.9 | 0.80   | -9.9 |
| 22   | 0.4355           | 0.0124     | 1.28  | 9.9  | 1.37   | 9.9  |
| 23   | -1.4705          | 0.0133     | 0.90  | -9.9 | 0.85   | -9.9 |
| 26   | -0.5470          | 0.0119     | 1.11  | 9.9  | 1.13   | 9.9  |
| 27   | -0.7918          | 0.0121     | 1.01  | 2.1  | 1.00   | -0.7 |
| 28   | -0.9316          | 0.0123     | 1.07  | 9.9  | 1.07   | 9.9  |
| 29   | -0.1492          | 0.0119     | 1.00  | -0.2 | 1.00   | 0.4  |
| 30   | 0.2335           | 0.0122     | 1.14  | 9.9  | 1.17   | 9.9  |
| 31   | -1.1536          | 0.0126     | 0.95  | -9.9 | 0.91   | -9.9 |
| 32   | -0.4855          | 0.0119     | 0.99  | -3.8 | 0.98   | -4.1 |
| 33   | -0.0325          | 0.0119     | 1.09  | 9.9  | 1.11   | 9.9  |
| 34   | -0.0649          | 0.0119     | 1.07  | 9.9  | 1.09   | 9.9  |
| 35   | -0.7641          | 0.0121     | 0.94  | -9.9 | 0.94   | -9.9 |
| 36   | -1.0863          | 0.0125     | 0.99  | -2.4 | 0.95   | -7.4 |
| 37   | -0.3894          | 0.0119     | 1.02  | 5.2  | 1.02   | 3.8  |
| 38   | 0.3336           | 0.0123     | 1.13  | 9.9  | 1.17   | 9.9  |
| 39   | 0.9604           | 0.0136     | 1.22  | 9.9  | 1.36   | 9.9  |
| 40   | 0.4634           | 0.0125     | 1.20  | 9.9  | 1.28   | 9.9  |
| 41   | -1.2593          | 0.0128     | 0.88  | -9.9 | 0.83   | -9.9 |
| 42   | -0.3930          | 0.0119     | 0.94  | -9.9 | 0.94   | -9.9 |
| 43   | -0.2587          | 0.0119     | 1.05  | 9.9  | 1.06   | 9.9  |
| 44   | -0.3794          | 0.0119     | 1.08  | 9.9  | 1.09   | 9.9  |
| 45   | 0.3070           | 0.0122     | 1.10  | 9.9  | 1.15   | 9.9  |
| 46   | -0.2267          | 0.0119     | 1.00  | 0.9  | 1.00   | 0.4  |
| 47   | -0.1648          | 0.0119     | 0.99  | -1.5 | 1.00   | -0.7 |
| 48   | 0.4842           | 0.0125     | 1.01  | 1.7  | 1.05   | 7.1  |
| 49   | -0.2645          | 0.0119     | 1.07  | 9.9  | 1.08   | 9.9  |
| 50   | -0.2337          | 0.0119     | 1.01  | 2.8  | 1.01   | 1.6  |
| 51   | 1.1973           | 0.0143     | 1.20  | 9.9  | 1.40   | 9.9  |
| 52   | -0.4759          | 0.0119     | 0.99  | -3.4 | 0.98   | -3.5 |
| 53   | 0.1759           | 0.0121     | 1.06  | 9.9  | 1.10   | 9.9  |

| Seq. | Anchored Measure | Measure SE | InFit |      | OutFit |      |
|------|------------------|------------|-------|------|--------|------|
|      |                  |            | MS    | ZSTD | MS     | ZSTD |
| 54   | 0.9656           | 0.0136     | 1.14  | 9.9  | 1.35   | 9.9  |
| 55   | -0.3178          | 0.0119     | 0.95  | -9.9 | 0.94   | -9.9 |
| 56   | -0.6251          | 0.0120     | 0.99  | -1.5 | 0.99   | -1.2 |
| 57   | -1.3854          | 0.0131     | 1.01  | 0.9  | 0.95   | -6.1 |
| 58   | -1.1408          | 0.0126     | 0.99  | -2.4 | 0.97   | -3.5 |
| 59   | -0.0434          | 0.0119     | 0.96  | -9.9 | 0.96   | -8.9 |
| 60   | -1.2296          | 0.0128     | 0.98  | -3.8 | 0.92   | -9.9 |
| 61   | 0.0407           | 0.0120     | 1.02  | 4.7  | 1.03   | 6.6  |
| 62   | -0.0889          | 0.0119     | 1.03  | 7.3  | 1.03   | 6.8  |

### Appendix C: 2009 Grade 12 Fall Mathematics Retest Open-ended Item Statistics

| Item Description |     |       | Proportions |       |       |       |       |       |       |       |       | Correlations |        |        |       |       |       |
|------------------|-----|-------|-------------|-------|-------|-------|-------|-------|-------|-------|-------|--------------|--------|--------|-------|-------|-------|
| Seq.             | Max | N     | Mean        | 0     | 1     | 2     | 3     | 4     | B     | K     | U     | Tot. Corr.   | 0      | 1      | 2     | 3     | 4     |
| 24               | 4   | 32438 | 1.665       | 0.172 | 0.305 | 0.303 | 0.128 | 0.093 | 0.025 | 0.000 | 0.000 | 0.571        | -0.433 | -0.201 | 0.196 | 0.240 | 0.295 |
| 25               | 4   | 32438 | 1.463       | 0.246 | 0.199 | 0.431 | 0.094 | 0.030 | 0.053 | 0.000 | 0.000 | 0.532        | -0.467 | -0.022 | 0.197 | 0.260 | 0.213 |
| 63               | 4   | 32438 | 0.544       | 0.557 | 0.376 | 0.038 | 0.026 | 0.004 | 0.234 | 0.001 | 0.000 | 0.361        | -0.317 | 0.189  | 0.182 | 0.164 | 0.093 |

NOTE: B = blank; K = off task; U = unreadable.



### Appendix D: 2009 Grade 12 Fall Reading Retest Multiple-Choice Item Statistics

| Item Description |     |       | Proportions |       |       |       |       |       |       | Point Biserials |        |        |        |        |
|------------------|-----|-------|-------------|-------|-------|-------|-------|-------|-------|-----------------|--------|--------|--------|--------|
| Seq.             | Key | N     | P-Value     | A     | B     | C     | D     | -     | *     | Tot. Corr.      | A      | B      | C      | D      |
| 1                | A   | 24329 | 0.589       | 0.589 | 0.331 | 0.029 | 0.049 | 0.002 | 0.000 | 0.310           | 0.310  | -0.218 | -0.169 | -0.092 |
| 2                | D   | 24329 | 0.796       | 0.119 | 0.039 | 0.045 | 0.796 | 0.001 | 0.000 | 0.373           | -0.169 | -0.205 | -0.263 | 0.373  |
| 3                | A   | 24329 | 0.681       | 0.681 | 0.161 | 0.080 | 0.076 | 0.001 | 0.000 | 0.403           | 0.403  | -0.263 | -0.190 | -0.145 |
| 4                | A   | 24329 | 0.436       | 0.436 | 0.086 | 0.411 | 0.066 | 0.001 | 0.000 | 0.166           | 0.166  | -0.197 | 0.044  | -0.191 |
| 5                | B   | 24329 | 0.378       | 0.088 | 0.378 | 0.345 | 0.186 | 0.003 | 0.000 | 0.120           | -0.194 | 0.120  | -0.004 | 0.000  |
| 6                | D   | 24329 | 0.336       | 0.068 | 0.517 | 0.078 | 0.336 | 0.001 | 0.000 | 0.131           | -0.116 | -0.012 | -0.096 | 0.131  |
| 7                | C   | 24329 | 0.581       | 0.044 | 0.155 | 0.581 | 0.218 | 0.002 | 0.000 | 0.158           | -0.200 | -0.081 | 0.158  | -0.015 |
| 8                | C   | 24329 | 0.697       | 0.057 | 0.102 | 0.697 | 0.140 | 0.003 | 0.000 | 0.266           | -0.271 | -0.105 | 0.266  | -0.075 |
| 10               | A   | 24329 | 0.580       | 0.580 | 0.073 | 0.181 | 0.163 | 0.002 | 0.000 | 0.227           | 0.227  | -0.247 | -0.123 | 0.002  |
| 11               | A   | 24329 | 0.661       | 0.661 | 0.100 | 0.069 | 0.169 | 0.001 | 0.000 | 0.281           | 0.281  | -0.177 | -0.223 | -0.058 |
| 12               | C   | 24329 | 0.811       | 0.044 | 0.097 | 0.811 | 0.046 | 0.001 | 0.000 | 0.350           | -0.234 | -0.152 | 0.350  | -0.198 |
| 13               | B   | 24329 | 0.573       | 0.052 | 0.573 | 0.325 | 0.047 | 0.001 | 0.001 | 0.311           | -0.241 | 0.311  | -0.096 | -0.246 |
| 14               | C   | 24329 | 0.423       | 0.090 | 0.046 | 0.423 | 0.439 | 0.002 | 0.001 | 0.167           | -0.138 | -0.274 | 0.167  | 0.035  |
| 15               | C   | 24329 | 0.785       | 0.034 | 0.135 | 0.785 | 0.044 | 0.002 | 0.001 | 0.353           | -0.225 | -0.181 | 0.353  | -0.192 |
| 16               | B   | 24329 | 0.564       | 0.088 | 0.564 | 0.107 | 0.238 | 0.002 | 0.000 | 0.371           | -0.242 | 0.371  | -0.207 | -0.113 |
| 17               | D   | 24329 | 0.641       | 0.092 | 0.157 | 0.107 | 0.641 | 0.003 | 0.001 | 0.435           | -0.234 | -0.192 | -0.219 | 0.435  |
| 18               | C   | 24329 | 0.789       | 0.078 | 0.067 | 0.789 | 0.063 | 0.003 | 0.000 | 0.459           | -0.253 | -0.257 | 0.459  | -0.212 |
| 19               | A   | 24329 | 0.765       | 0.765 | 0.093 | 0.083 | 0.054 | 0.004 | 0.001 | 0.346           | 0.346  | -0.197 | -0.171 | -0.168 |
| 20               | C   | 24329 | 0.472       | 0.093 | 0.342 | 0.472 | 0.089 | 0.003 | 0.001 | 0.213           | -0.143 | -0.042 | 0.213  | -0.140 |
| 21               | D   | 24329 | 0.290       | 0.251 | 0.092 | 0.361 | 0.290 | 0.004 | 0.001 | 0.193           | 0.020  | -0.266 | -0.029 | 0.193  |
| 22               | C   | 24329 | 0.471       | 0.135 | 0.282 | 0.471 | 0.107 | 0.005 | 0.001 | 0.253           | -0.168 | -0.057 | 0.253  | -0.121 |
| 23               | A   | 24329 | 0.268       | 0.268 | 0.173 | 0.208 | 0.344 | 0.005 | 0.001 | 0.160           | 0.160  | -0.199 | -0.130 | 0.133  |
| 24               | A   | 24329 | 0.339       | 0.339 | 0.137 | 0.362 | 0.156 | 0.005 | 0.001 | 0.196           | 0.196  | -0.163 | 0.005  | -0.092 |
| 25               | A   | 24329 | 0.432       | 0.432 | 0.169 | 0.171 | 0.222 | 0.006 | 0.000 | 0.315           | 0.315  | -0.182 | -0.180 | -0.036 |
| 27               | D   | 24329 | 0.623       | 0.225 | 0.074 | 0.076 | 0.623 | 0.001 | 0.000 | 0.391           | -0.119 | -0.259 | -0.268 | 0.391  |
| 28               | B   | 24329 | 0.688       | 0.229 | 0.688 | 0.050 | 0.033 | 0.001 | 0.000 | 0.318           | -0.120 | 0.318  | -0.283 | -0.195 |
| 29               | A   | 24329 | 0.304       | 0.304 | 0.237 | 0.190 | 0.266 | 0.003 | 0.001 | 0.203           | 0.203  | -0.100 | -0.100 | -0.025 |
| 30               | B   | 24329 | 0.170       | 0.081 | 0.170 | 0.094 | 0.653 | 0.001 | 0.001 | 0.066           | -0.184 | 0.066  | -0.253 | 0.212  |
| 31               | D   | 24329 | 0.410       | 0.303 | 0.181 | 0.104 | 0.410 | 0.002 | 0.001 | 0.310           | -0.055 | -0.166 | -0.199 | 0.310  |
| 32               | C   | 24329 | 0.744       | 0.070 | 0.121 | 0.744 | 0.063 | 0.002 | 0.001 | 0.359           | -0.230 | -0.171 | 0.359  | -0.165 |
| 33               | C   | 24329 | 0.555       | 0.080 | 0.149 | 0.555 | 0.213 | 0.002 | 0.000 | 0.296           | -0.217 | -0.191 | 0.296  | -0.045 |

**2009 PSSA Grade 12 Retest Technical Report for Mathematics, Reading, Science, and Writing**

| Item Description |     |       | Proportions |       |       |       |       |       |       | Point Biserials |        |        |        |        |
|------------------|-----|-------|-------------|-------|-------|-------|-------|-------|-------|-----------------|--------|--------|--------|--------|
| Seq.             | Key | N     | P-Value     | A     | B     | C     | D     | -     | *     | Tot. Corr.      | A      | B      | C      | D      |
| 35               | D   | 24329 | 0.407       | 0.091 | 0.083 | 0.412 | 0.407 | 0.007 | 0.000 | 0.255           | -0.274 | -0.285 | 0.082  | 0.255  |
| 36               | B   | 24329 | 0.590       | 0.234 | 0.590 | 0.064 | 0.104 | 0.008 | 0.000 | 0.299           | -0.007 | 0.299  | -0.300 | -0.200 |
| 37               | C   | 24329 | 0.369       | 0.357 | 0.131 | 0.369 | 0.133 | 0.008 | 0.001 | 0.217           | 0.066  | -0.240 | 0.217  | -0.131 |
| 38               | B   | 24329 | 0.468       | 0.144 | 0.468 | 0.255 | 0.123 | 0.009 | 0.001 | 0.301           | -0.154 | 0.301  | -0.035 | -0.215 |
| 39               | B   | 24329 | 0.701       | 0.084 | 0.701 | 0.085 | 0.119 | 0.009 | 0.001 | 0.423           | -0.197 | 0.423  | -0.277 | -0.157 |
| 40               | C   | 24329 | 0.361       | 0.082 | 0.331 | 0.361 | 0.215 | 0.009 | 0.001 | 0.189           | -0.211 | 0.050  | 0.189  | -0.113 |
| 41               | A   | 24329 | 0.559       | 0.559 | 0.180 | 0.094 | 0.156 | 0.010 | 0.001 | 0.400           | 0.400  | -0.195 | -0.246 | -0.114 |
| 42               | A   | 24329 | 0.311       | 0.311 | 0.131 | 0.317 | 0.229 | 0.010 | 0.001 | 0.213           | 0.213  | -0.215 | -0.034 | 0.001  |
| 43               | B   | 24329 | 0.336       | 0.100 | 0.336 | 0.264 | 0.289 | 0.011 | 0.001 | 0.213           | -0.161 | 0.213  | -0.001 | -0.091 |

NOTE: "-" denotes omits; "\*" denotes multiple marks.

**Appendix E: 2009 Grade 12 Fall Reading Retest  
Multiple-Choice Rasch Item Statistics**

| Seq. | Anchored Measure | Measure SE | InFit |      | OutFit |      |
|------|------------------|------------|-------|------|--------|------|
|      |                  |            | MS    | ZSTD | MS     | ZSTD |
| 1    | -0.4550          | 0.0141     | 1.03  | 5.2  | 1.02   | 2.3  |
| 2    | -1.4455          | 0.0167     | 0.89  | -9.9 | 0.86   | -9.9 |
| 3    | -0.8216          | 0.0148     | 0.93  | -9.9 | 0.89   | -9.9 |
| 4    | 0.4865           | 0.0140     | 1.13  | 9.9  | 1.19   | 9.9  |
| 5    | 0.6859           | 0.0142     | 1.15  | 9.9  | 1.24   | 9.9  |
| 6    | 1.3492           | 0.0157     | 1.36  | 9.9  | 1.58   | 9.9  |
| 7    | 0.2610           | 0.0138     | 1.18  | 9.9  | 1.24   | 9.9  |
| 8    | -0.4933          | 0.0142     | 0.96  | -7.8 | 0.97   | -4.6 |
| 10   | -0.0012          | 0.0138     | 1.07  | 9.9  | 1.09   | 9.9  |
| 11   | -0.4756          | 0.0142     | 0.98  | -3.4 | 0.98   | -2.2 |
| 12   | -1.4520          | 0.0167     | 0.87  | -9.9 | 0.83   | -9.9 |
| 13   | -0.0695          | 0.0138     | 0.99  | -1.3 | 1.00   | -0.3 |
| 14   | 0.8516           | 0.0145     | 1.23  | 9.9  | 1.36   | 9.9  |
| 15   | -1.2762          | 0.0160     | 0.88  | -9.9 | 0.84   | -9.9 |
| 16   | -0.1028          | 0.0138     | 0.95  | -9.9 | 0.94   | -9.9 |
| 17   | -0.6417          | 0.0144     | 0.91  | -9.9 | 0.88   | -9.9 |
| 18   | -1.5061          | 0.0169     | 0.89  | -9.9 | 0.77   | -9.9 |
| 19   | -1.3289          | 0.0162     | 0.97  | -3.6 | 0.95   | -4.1 |
| 20   | 0.1273           | 0.0138     | 1.08  | 9.9  | 1.10   | 9.9  |
| 21   | 1.1528           | 0.0152     | 1.08  | 9.9  | 1.19   | 9.9  |
| 22   | 0.3840           | 0.0139     | 1.07  | 9.9  | 1.09   | 9.9  |
| 23   | 1.2930           | 0.0156     | 1.10  | 9.9  | 1.30   | 9.9  |
| 24   | 0.9115           | 0.0146     | 1.08  | 9.9  | 1.19   | 9.9  |
| 25   | 0.1845           | 0.0138     | 0.98  | -3.3 | 0.99   | -1.0 |
| 27   | -0.6752          | 0.0145     | 0.97  | -4.3 | 0.98   | -2.2 |
| 28   | -0.9120          | 0.0150     | 1.01  | 1.6  | 1.01   | 1.1  |
| 29   | 0.8367           | 0.0144     | 1.00  | 0.9  | 1.07   | 8.5  |
| 30   | 1.7332           | 0.0172     | 1.01  | 0.7  | 1.43   | 9.9  |
| 31   | 0.2140           | 0.0138     | 0.99  | -3.2 | 0.99   | -2.3 |
| 32   | -1.1036          | 0.0155     | 0.92  | -9.9 | 0.92   | -7.4 |
| 33   | 0.0054           | 0.0138     | 1.01  | 2.4  | 1.02   | 3.7  |
| 35   | 0.5900           | 0.0141     | 1.06  | 9.9  | 1.07   | 9.9  |
| 36   | -0.3803          | 0.0140     | 1.02  | 3.4  | 1.02   | 2.9  |
| 37   | 0.6796           | 0.0142     | 1.05  | 9.9  | 1.12   | 9.9  |
| 38   | 0.1123           | 0.0138     | 1.01  | 1.3  | 1.01   | 2.4  |
| 39   | -1.3005          | 0.0161     | 1.09  | 9.9  | 1.04   | 3.3  |
| 40   | 0.6881           | 0.0142     | 1.07  | 9.9  | 1.14   | 9.9  |
| 41   | -0.4932          | 0.0142     | 1.00  | -0.9 | 0.98   | -3.3 |
| 42   | 0.7718           | 0.0143     | 1.00  | -0.2 | 1.05   | 6.4  |
| 43   | 0.7162           | 0.0142     | 1.02  | 4.2  | 1.08   | 9.9  |

**Appendix F: 2009 Grade 12 Fall Reading Retest  
Open-ended Item Statistics**

| Item Description |     |       | Proportions |       |       |       |       |       |       |       |       | Correlations |        |        |       |       |
|------------------|-----|-------|-------------|-------|-------|-------|-------|-------|-------|-------|-------|--------------|--------|--------|-------|-------|
| Seq.             | Max | N     | Mean        | 0     | 1     | 2     | 3     | B     | F     | K     | U     | Tot. Corr.   | 0      | 1      | 2     | 3     |
| 9                | 3   | 24329 | 1.595       | 0.100 | 0.281 | 0.544 | 0.075 | 0.040 | 0.000 | 0.001 | 0.000 | 0.543        | -0.395 | -0.261 | 0.346 | 0.240 |
| 26               | 3   | 24329 | 1.457       | 0.169 | 0.297 | 0.441 | 0.093 | 0.057 | 0.000 | 0.008 | 0.000 | 0.562        | -0.462 | -0.151 | 0.330 | 0.270 |
| 34               | 3   | 24329 | 1.342       | 0.224 | 0.284 | 0.418 | 0.074 | 0.078 | 0.000 | 0.003 | 0.000 | 0.580        | -0.492 | -0.104 | 0.372 | 0.262 |
| 44               | 3   | 24329 | 1.459       | 0.176 | 0.270 | 0.473 | 0.081 | 0.072 | 0.000 | 0.002 | 0.000 | 0.563        | -0.481 | -0.136 | 0.359 | 0.237 |

NOTE: B = blank; F = foreign language; K = off task; U = unreadable.

**Appendix G: 2009 Grade 12 Fall Science Retest  
Multiple-Choice Item Statistics**

| Item Description |     |       | Proportions |       |       |       |       |       |       | Point Biserials |        |        |        |        |
|------------------|-----|-------|-------------|-------|-------|-------|-------|-------|-------|-----------------|--------|--------|--------|--------|
| Seq.             | Key | N     | P-Value     | A     | B     | C     | D     | -     | *     | Tot. Corr.      | A      | B      | C      | D      |
| 1                | B   | 26241 | 0.764       | 0.062 | 0.764 | 0.101 | 0.070 | 0.002 | 0.000 | 0.181           | -0.129 | 0.181  | -0.155 | 0.008  |
| 2                | A   | 26241 | 0.770       | 0.770 | 0.049 | 0.055 | 0.123 | 0.002 | 0.000 | 0.244           | 0.244  | -0.180 | -0.226 | -0.032 |
| 3                | C   | 26241 | 0.687       | 0.062 | 0.196 | 0.687 | 0.051 | 0.004 | 0.000 | 0.332           | -0.160 | -0.186 | 0.332  | -0.173 |
| 4                | B   | 26241 | 0.797       | 0.040 | 0.797 | 0.045 | 0.118 | 0.001 | 0.000 | 0.353           | -0.169 | 0.353  | -0.195 | -0.210 |
| 5                | D   | 26241 | 0.415       | 0.112 | 0.216 | 0.254 | 0.415 | 0.002 | 0.000 | 0.200           | -0.045 | -0.025 | -0.167 | 0.200  |
| 6                | C   | 26241 | 0.665       | 0.094 | 0.108 | 0.665 | 0.128 | 0.005 | 0.000 | 0.353           | -0.204 | -0.191 | 0.353  | -0.134 |
| 7                | D   | 26241 | 0.832       | 0.113 | 0.025 | 0.028 | 0.832 | 0.001 | 0.000 | 0.317           | -0.193 | -0.174 | -0.175 | 0.317  |
| 8                | C   | 26241 | 0.489       | 0.110 | 0.241 | 0.489 | 0.158 | 0.002 | 0.000 | 0.168           | -0.136 | -0.019 | 0.168  | -0.089 |
| 9                | A   | 26241 | 0.870       | 0.870 | 0.042 | 0.046 | 0.040 | 0.001 | 0.000 | 0.341           | 0.341  | -0.229 | -0.217 | -0.113 |
| 10               | A   | 26241 | 0.720       | 0.720 | 0.072 | 0.140 | 0.066 | 0.002 | 0.000 | 0.399           | 0.399  | -0.201 | -0.254 | -0.154 |
| 11               | D   | 26241 | 0.545       | 0.104 | 0.144 | 0.201 | 0.545 | 0.006 | 0.000 | 0.350           | -0.175 | -0.177 | -0.137 | 0.350  |
| 12               | C   | 26241 | 0.793       | 0.067 | 0.086 | 0.793 | 0.053 | 0.002 | 0.000 | 0.355           | -0.201 | -0.239 | 0.355  | -0.115 |
| 13               | B   | 26241 | 0.861       | 0.053 | 0.861 | 0.073 | 0.013 | 0.001 | 0.000 | 0.358           | -0.210 | 0.358  | -0.231 | -0.145 |
| 14               | D   | 26241 | 0.497       | 0.106 | 0.195 | 0.198 | 0.497 | 0.002 | 0.000 | 0.271           | -0.095 | -0.067 | -0.197 | 0.271  |
| 16               | C   | 26241 | 0.351       | 0.113 | 0.441 | 0.351 | 0.093 | 0.001 | 0.000 | 0.091           | -0.115 | 0.026  | 0.091  | -0.066 |
| 17               | A   | 26241 | 0.333       | 0.333 | 0.213 | 0.274 | 0.176 | 0.005 | 0.000 | 0.096           | 0.096  | -0.088 | -0.079 | 0.068  |
| 18               | B   | 26241 | 0.366       | 0.279 | 0.366 | 0.232 | 0.121 | 0.003 | 0.000 | 0.118           | -0.010 | 0.118  | -0.079 | -0.055 |
| 19               | D   | 26241 | 0.522       | 0.131 | 0.217 | 0.124 | 0.522 | 0.006 | 0.000 | 0.380           | -0.204 | -0.103 | -0.234 | 0.380  |
| 21               | B   | 26241 | 0.525       | 0.092 | 0.525 | 0.264 | 0.111 | 0.008 | 0.000 | 0.225           | -0.150 | 0.225  | -0.111 | -0.057 |
| 22               | D   | 26241 | 0.234       | 0.266 | 0.289 | 0.201 | 0.234 | 0.010 | 0.000 | 0.377           | -0.081 | -0.083 | -0.206 | 0.377  |
| 23               | B   | 26241 | 0.360       | 0.153 | 0.360 | 0.312 | 0.148 | 0.026 | 0.000 | 0.191           | 0.000  | 0.191  | -0.058 | -0.161 |
| 24               | A   | 26241 | 0.404       | 0.404 | 0.067 | 0.364 | 0.157 | 0.007 | 0.001 | 0.364           | 0.364  | -0.195 | -0.106 | -0.209 |
| 26               | D   | 26241 | 0.451       | 0.248 | 0.209 | 0.090 | 0.451 | 0.002 | 0.000 | 0.379           | -0.078 | -0.228 | -0.209 | 0.379  |
| 27               | D   | 26241 | 0.513       | 0.100 | 0.095 | 0.290 | 0.513 | 0.002 | 0.000 | 0.284           | -0.129 | -0.233 | -0.074 | 0.284  |
| 28               | C   | 26241 | 0.680       | 0.101 | 0.167 | 0.680 | 0.049 | 0.002 | 0.000 | 0.317           | -0.279 | -0.075 | 0.317  | -0.160 |
| 29               | B   | 26241 | 0.402       | 0.140 | 0.402 | 0.298 | 0.155 | 0.004 | 0.000 | 0.182           | -0.060 | 0.182  | -0.102 | -0.059 |
| 30               | C   | 26241 | 0.570       | 0.171 | 0.195 | 0.570 | 0.055 | 0.009 | 0.000 | 0.302           | -0.230 | -0.040 | 0.302  | -0.209 |
| 31               | C   | 26241 | 0.385       | 0.274 | 0.257 | 0.385 | 0.075 | 0.009 | 0.000 | 0.093           | 0.093  | -0.071 | 0.093  | -0.197 |
| 32               | A   | 26241 | 0.510       | 0.510 | 0.186 | 0.094 | 0.208 | 0.001 | 0.000 | 0.334           | 0.334  | -0.179 | -0.271 | -0.041 |
| 33               | D   | 26241 | 0.408       | 0.169 | 0.296 | 0.125 | 0.408 | 0.002 | 0.000 | 0.312           | -0.167 | -0.049 | -0.203 | 0.312  |
| 34               | B   | 26241 | 0.443       | 0.103 | 0.443 | 0.342 | 0.096 | 0.015 | 0.000 | 0.295           | -0.244 | 0.295  | -0.030 | -0.187 |
| 35               | D   | 26241 | 0.734       | 0.075 | 0.097 | 0.092 | 0.734 | 0.002 | 0.000 | 0.529           | -0.218 | -0.304 | -0.294 | 0.529  |
| 36               | C   | 26241 | 0.460       | 0.119 | 0.227 | 0.460 | 0.188 | 0.006 | 0.000 | 0.266           | -0.211 | -0.087 | 0.266  | -0.066 |

**2009 PSSA Grade 12 Retest Technical Report for Mathematics, Reading, Science, and Writing**

| Item Description |     |       | Proportions |       |       |       |       |       |       | Point Biserials |        |        |        |        |
|------------------|-----|-------|-------------|-------|-------|-------|-------|-------|-------|-----------------|--------|--------|--------|--------|
| Seq.             | Key | N     | P-Value     | A     | B     | C     | D     | -     | *     | Tot. Corr.      | A      | B      | C      | D      |
| 37               | C   | 26241 | 0.500       | 0.245 | 0.124 | 0.500 | 0.128 | 0.002 | 0.000 | 0.212           | -0.088 | -0.207 | 0.212  | 0.005  |
| 41               | B   | 26241 | 0.423       | 0.244 | 0.423 | 0.239 | 0.091 | 0.003 | 0.000 | 0.197           | -0.139 | 0.197  | -0.056 | -0.043 |
| 42               | B   | 26241 | 0.660       | 0.114 | 0.660 | 0.120 | 0.102 | 0.004 | 0.000 | 0.494           | -0.276 | 0.494  | -0.243 | -0.214 |
| 43               | B   | 26241 | 0.459       | 0.305 | 0.459 | 0.147 | 0.072 | 0.016 | 0.000 | 0.238           | 0.083  | 0.238  | -0.250 | -0.235 |
| 44               | C   | 26241 | 0.249       | 0.257 | 0.247 | 0.249 | 0.242 | 0.003 | 0.001 | 0.131           | 0.051  | -0.068 | 0.131  | -0.110 |
| 46               | C   | 26241 | 0.385       | 0.245 | 0.254 | 0.385 | 0.113 | 0.003 | 0.000 | 0.082           | -0.013 | -0.113 | 0.082  | 0.052  |
| 47               | C   | 26241 | 0.669       | 0.163 | 0.096 | 0.669 | 0.070 | 0.002 | 0.000 | 0.377           | -0.117 | -0.250 | 0.377  | -0.230 |
| 48               | D   | 26241 | 0.545       | 0.117 | 0.151 | 0.183 | 0.545 | 0.004 | 0.000 | 0.441           | -0.229 | -0.197 | -0.189 | 0.441  |
| 49               | D   | 26241 | 0.419       | 0.154 | 0.204 | 0.220 | 0.419 | 0.003 | 0.000 | 0.254           | -0.162 | -0.073 | -0.086 | 0.254  |
| 50               | B   | 26241 | 0.469       | 0.278 | 0.469 | 0.152 | 0.096 | 0.005 | 0.000 | 0.266           | -0.010 | 0.266  | -0.201 | -0.184 |
| 51               | C   | 26241 | 0.716       | 0.091 | 0.130 | 0.716 | 0.061 | 0.002 | 0.000 | 0.394           | -0.316 | -0.180 | 0.394  | -0.103 |
| 52               | A   | 26241 | 0.292       | 0.292 | 0.244 | 0.314 | 0.147 | 0.003 | 0.000 | 0.271           | 0.271  | -0.149 | -0.060 | -0.086 |
| 53               | D   | 26241 | 0.641       | 0.140 | 0.094 | 0.123 | 0.641 | 0.003 | 0.000 | 0.500           | -0.265 | -0.238 | -0.234 | 0.500  |
| 54               | A   | 26241 | 0.326       | 0.326 | 0.289 | 0.313 | 0.069 | 0.003 | 0.000 | 0.168           | 0.168  | -0.082 | 0.009  | -0.177 |
| 55               | A   | 26241 | 0.390       | 0.390 | 0.249 | 0.226 | 0.133 | 0.003 | 0.000 | 0.168           | 0.168  | -0.059 | -0.106 | -0.031 |
| 56               | C   | 26241 | 0.630       | 0.085 | 0.117 | 0.630 | 0.165 | 0.003 | 0.000 | 0.365           | -0.278 | -0.238 | 0.365  | -0.055 |
| 57               | A   | 26241 | 0.341       | 0.341 | 0.231 | 0.192 | 0.232 | 0.004 | 0.000 | 0.205           | 0.205  | -0.118 | -0.163 | 0.045  |

NOTE: "-" denotes omits; "\*" denotes multiple marks.

**Appendix H: 2009 Grade 12 Fall Science Retest  
Multiple-Choice Rasch Item Statistics**

| Seq. | Anchored Measure | Measure SE | InFit |      | OutFit |      |
|------|------------------|------------|-------|------|--------|------|
|      |                  |            | MS    | ZSTD | MS     | ZSTD |
| 1    | -1.2470          | 0.0148     | 1.00  | 0.0  | 1.03   | 3.0  |
| 2    | -1.4563          | 0.0154     | 1.01  | 0.8  | 1.03   | 2.5  |
| 3    | -0.8002          | 0.0138     | 0.93  | -9.9 | 0.91   | -9.9 |
| 4    | -1.4805          | 0.0155     | 0.86  | -9.9 | 0.79   | -9.9 |
| 5    | 0.1985           | 0.0133     | 1.08  | 9.9  | 1.09   | 9.9  |
| 6    | -0.8985          | 0.0140     | 0.96  | -6.8 | 0.95   | -7.1 |
| 7    | -1.9036          | 0.0172     | 0.94  | -6.3 | 0.88   | -7.8 |
| 8    | -0.0197          | 0.0132     | 1.12  | 9.9  | 1.14   | 9.9  |
| 9    | -2.2536          | 0.0192     | 0.91  | -7.0 | 0.79   | -9.9 |
| 10   | -1.1239          | 0.0145     | 0.89  | -9.9 | 0.86   | -9.9 |
| 11   | -0.2851          | 0.0133     | 0.97  | -7.1 | 0.96   | -6.9 |
| 12   | -1.5825          | 0.0159     | 0.90  | -9.9 | 0.85   | -9.9 |
| 13   | -2.0762          | 0.0181     | 0.85  | -9.9 | 0.74   | -9.9 |
| 14   | 0.0188           | 0.0132     | 1.04  | 8.6  | 1.05   | 8.2  |
| 16   | 0.9190           | 0.0144     | 1.27  | 9.9  | 1.46   | 9.9  |
| 17   | 0.9377           | 0.0144     | 1.23  | 9.9  | 1.45   | 9.9  |
| 18   | 0.9927           | 0.0146     | 1.33  | 9.9  | 1.52   | 9.9  |
| 19   | -0.1883          | 0.0132     | 0.95  | -9.9 | 0.94   | -9.9 |
| 21   | 0.0523           | 0.0132     | 1.09  | 9.9  | 1.12   | 9.9  |
| 22   | 0.9299           | 0.0144     | 0.82  | -9.9 | 0.80   | -9.9 |
| 23   | 0.6226           | 0.0138     | 1.09  | 9.9  | 1.17   | 9.9  |
| 24   | 0.4217           | 0.0135     | 0.97  | -7.1 | 0.98   | -3.0 |
| 26   | 0.0017           | 0.0132     | 0.94  | -9.9 | 0.93   | -9.9 |
| 27   | 0.0547           | 0.0132     | 1.04  | 8.2  | 1.05   | 8.5  |
| 28   | -0.9877          | 0.0141     | 0.98  | -3.4 | 1.00   | 0.6  |
| 29   | 0.3346           | 0.0134     | 1.09  | 9.9  | 1.14   | 9.9  |
| 30   | -0.2366          | 0.0132     | 1.00  | -0.5 | 1.00   | 0.2  |
| 31   | 0.5132           | 0.0136     | 1.18  | 9.9  | 1.25   | 9.9  |
| 32   | -0.0978          | 0.0132     | 0.98  | -4.1 | 0.99   | -1.9 |
| 33   | 0.2891           | 0.0134     | 0.99  | -2.4 | 1.00   | 0.3  |
| 34   | 0.3457           | 0.0134     | 1.04  | 8.7  | 1.06   | 9.8  |
| 35   | -1.5405          | 0.0157     | 0.94  | -6.8 | 0.82   | -9.9 |
| 36   | 0.1058           | 0.0133     | 1.04  | 8.4  | 1.05   | 8.8  |
| 37   | 0.1829           | 0.0133     | 1.11  | 9.9  | 1.14   | 9.9  |
| 41   | 0.3217           | 0.0134     | 1.09  | 9.9  | 1.16   | 9.9  |
| 42   | -1.3871          | 0.0152     | 1.11  | 9.9  | 1.01   | 0.8  |
| 43   | -0.0055          | 0.0132     | 1.06  | 9.9  | 1.08   | 9.9  |
| 44   | 1.0082           | 0.0146     | 1.03  | 5.1  | 1.20   | 9.9  |
| 46   | 0.4552           | 0.0135     | 1.17  | 9.9  | 1.25   | 9.9  |
| 47   | -1.1316          | 0.0145     | 1.02  | 3.6  | 1.00   | 0.5  |
| 48   | -0.6048          | 0.0135     | 0.96  | -9.1 | 0.94   | -9.0 |
| 49   | 0.2519           | 0.0133     | 1.04  | 8.3  | 1.07   | 9.9  |
| 50   | -0.1128          | 0.0132     | 1.04  | 9.1  | 1.05   | 9.6  |
| 51   | -1.3103          | 0.0150     | 0.97  | -3.5 | 0.95   | -4.7 |
| 52   | 0.6323           | 0.0138     | 0.94  | -9.9 | 0.97   | -4.0 |
| 53   | -1.1881          | 0.0146     | 1.02  | 2.5  | 0.95   | -5.0 |
| 54   | 0.6737           | 0.0139     | 1.08  | 9.9  | 1.14   | 9.9  |
| 55   | 0.3648           | 0.0134     | 1.10  | 9.9  | 1.16   | 9.9  |
| 56   | -0.8958          | 0.0140     | 1.00  | 0.3  | 1.00   | 0.4  |
| 57   | 0.4556           | 0.0135     | 1.03  | 6.3  | 1.07   | 9.9  |

### Appendix I: 2009 Grade 12 Fall Science Retest Open-ended Item Statistics

| Item Description |     |       | Proportions |       |       |       |       |       |       |       |       |       | Correlations |        |       |       |       |       |
|------------------|-----|-------|-------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------------|--------|-------|-------|-------|-------|
| Seq.             | Max | N     | Mean        | 0     | 1     | 2     | 3     | 4     | B     | F     | K     | U     | Tot. Corr.   | 0      | 1     | 2     | 3     | 4     |
| 15               | 2   | 26241 | 0.366       | 0.709 | 0.216 | 0.075 |       |       | 0.129 | 0.000 | 0.003 | 0.000 | 0.295        | -0.285 | 0.187 | 0.200 |       |       |
| 20               | 4   | 26241 | 0.760       | 0.506 | 0.285 | 0.158 | 0.045 | 0.006 | 0.068 | 0.000 | 0.000 | 0.000 | 0.527        | -0.517 | 0.208 | 0.310 | 0.215 | 0.093 |
| 25               | 4   | 26241 | 0.309       | 0.760 | 0.186 | 0.041 | 0.011 | 0.002 | 0.196 | 0.000 | 0.000 | 0.000 | 0.323        | -0.311 | 0.212 | 0.180 | 0.114 | 0.063 |
| 38               | 2   | 26241 | 0.503       | 0.560 | 0.377 | 0.063 |       |       | 0.162 | 0.000 | 0.004 | 0.000 | 0.401        | -0.395 | 0.300 | 0.207 |       |       |
| 39               | 2   | 26241 | 0.572       | 0.528 | 0.371 | 0.100 |       |       | 0.128 | 0.000 | 0.002 | 0.000 | 0.342        | -0.328 | 0.206 | 0.214 |       |       |
| 40               | 2   | 26241 | 1.041       | 0.273 | 0.413 | 0.314 |       |       | 0.092 | 0.000 | 0.002 | 0.000 | 0.430        | -0.397 | 0.049 | 0.329 |       |       |
| 45               | 4   | 26241 | 0.742       | 0.547 | 0.244 | 0.142 | 0.056 | 0.012 | 0.161 | 0.000 | 0.000 | 0.000 | 0.517        | -0.512 | 0.203 | 0.288 | 0.231 | 0.134 |
| 58               | 2   | 26241 | 0.323       | 0.689 | 0.298 | 0.012 |       |       | 0.216 | 0.000 | 0.004 | 0.000 | 0.442        | -0.441 | 0.416 | 0.125 |       |       |
| 59               | 2   | 26241 | 0.236       | 0.798 | 0.169 | 0.033 |       |       | 0.144 | 0.000 | 0.003 | 0.000 | 0.371        | -0.370 | 0.302 | 0.199 |       |       |

NOTE: B = blank; F = foreign language; K = off task; U = unreadable.



### Appendix J: 2009 Grade 12 Fall Writing Retest Multiple-Choice Item Statistics

| Item Description |     |      | Proportions |       |       |       |       |       |       | Point Biserials |        |        |        |        |
|------------------|-----|------|-------------|-------|-------|-------|-------|-------|-------|-----------------|--------|--------|--------|--------|
| Seq.             | Key | N    | P-Value     | A     | B     | C     | D     | -     | *     | Tot. Corr.      | A      | B      | C      | D      |
| 1                | B   | 8840 | 0.784       | 0.090 | 0.784 | 0.098 | 0.027 | 0.001 | 0.000 | 0.319           | -0.144 | 0.319  | -0.226 | -0.135 |
| 2                | D   | 8840 | 0.612       | 0.129 | 0.148 | 0.109 | 0.612 | 0.001 | 0.000 | 0.390           | -0.225 | -0.173 | -0.168 | 0.390  |
| 3                | C   | 8840 | 0.737       | 0.095 | 0.072 | 0.737 | 0.094 | 0.002 | 0.000 | 0.409           | -0.187 | -0.223 | 0.409  | -0.225 |
| 4                | D   | 8840 | 0.595       | 0.229 | 0.087 | 0.086 | 0.595 | 0.003 | 0.000 | 0.386           | -0.188 | -0.162 | -0.227 | 0.386  |
| 5                | D   | 8840 | 0.263       | 0.287 | 0.204 | 0.243 | 0.263 | 0.002 | 0.000 | 0.234           | -0.082 | -0.081 | -0.075 | 0.234  |
| 6                | B   | 8840 | 0.704       | 0.045 | 0.704 | 0.134 | 0.116 | 0.001 | 0.000 | 0.334           | -0.203 | 0.334  | -0.176 | -0.154 |
| 7                | B   | 8840 | 0.549       | 0.168 | 0.549 | 0.171 | 0.110 | 0.002 | 0.000 | 0.346           | -0.158 | 0.346  | -0.192 | -0.128 |
| 8                | C   | 8840 | 0.583       | 0.237 | 0.042 | 0.583 | 0.136 | 0.002 | 0.000 | 0.348           | -0.159 | -0.222 | 0.348  | -0.170 |
| 9                | B   | 8840 | 0.585       | 0.168 | 0.585 | 0.184 | 0.060 | 0.003 | 0.000 | 0.408           | -0.200 | 0.408  | -0.195 | -0.207 |
| 10               | D   | 8840 | 0.385       | 0.088 | 0.148 | 0.376 | 0.385 | 0.003 | 0.000 | 0.277           | -0.095 | -0.176 | -0.090 | 0.277  |
| 11               | C   | 8840 | 0.605       | 0.170 | 0.117 | 0.605 | 0.105 | 0.003 | 0.000 | 0.385           | -0.143 | -0.260 | 0.385  | -0.161 |
| 12               | C   | 8840 | 0.646       | 0.090 | 0.114 | 0.646 | 0.148 | 0.002 | 0.000 | 0.374           | -0.224 | -0.209 | 0.374  | -0.130 |

NOTE: "-" denotes omits; "\*" denotes multiple marks.

**Appendix K: 2009 Grade 12 Fall Writing Retest  
Multiple-Choice Rasch Item Statistics**

| Seq. | Anchored Measure | Measure SE | InFit |      | OutFit |      |
|------|------------------|------------|-------|------|--------|------|
|      |                  |            | MS    | ZSTD | MS     | ZSTD |
| 1    | -1.1804          | 0.0266     | 1.48  | 9.9  | 3.75   | 9.9  |
| 2    | -0.0056          | 0.0275     | 1.93  | 9.9  | 5.15   | 9.9  |
| 3    | -1.0135          | 0.0265     | 1.44  | 9.9  | 3.11   | 9.9  |
| 4    | 0.3106           | 0.0284     | 2.18  | 9.9  | 7.21   | 9.9  |
| 5    | 2.6612           | 0.0433     | 3.61  | 9.9  | 9.90   | 9.9  |
| 6    | -0.3993          | 0.0268     | 1.83  | 9.9  | 5.77   | 9.9  |
| 7    | 0.1170           | 0.0279     | 1.91  | 9.9  | 6.53   | 9.9  |
| 8    | -0.2023          | 0.0271     | 1.79  | 9.9  | 5.17   | 9.9  |
| 9    | 0.0751           | 0.0277     | 1.91  | 9.9  | 5.28   | 9.9  |
| 10   | 1.4852           | 0.0341     | 2.80  | 9.9  | 9.90   | 9.9  |
| 11   | -0.1860          | 0.0271     | 1.76  | 9.9  | 5.12   | 9.9  |
| 12   | -0.5408          | 0.0266     | 1.62  | 9.9  | 6.37   | 9.9  |

**Appendix L: 2009 Grade 12 Fall Writing Retest  
Open-ended Item Statistics**

| Item Description |     |      | Proportions |       |       |       |       | Correlations |        |        |       |       |
|------------------|-----|------|-------------|-------|-------|-------|-------|--------------|--------|--------|-------|-------|
| Seq.             | Max | N    | Mean        | 1     | 2     | 3     | 4     | Tot. Corr.   | 1      | 2      | 3     | 4     |
| 13               | 4   | 8840 | 2.265       | 0.096 | 0.560 | 0.328 | 0.016 | 0.597        | -0.384 | -0.267 | 0.465 | 0.218 |
| 13               | 4   | 8840 | 2.287       | 0.070 | 0.593 | 0.318 | 0.020 | 0.646        | -0.371 | -0.362 | 0.513 | 0.241 |
| 14               | 4   | 8840 | 2.011       | 0.196 | 0.601 | 0.198 | 0.005 | 0.550        | -0.423 | -0.017 | 0.419 | 0.137 |
| 14               | 4   | 8840 | 2.138       | 0.114 | 0.643 | 0.234 | 0.009 | 0.627        | -0.416 | -0.201 | 0.500 | 0.185 |

## Appendix M: 2009 Grade 12 Fall Writing Retest Percentage Agreement

| Prompt | Composition       |                      |                    | Revising & Editing |                      |                    |
|--------|-------------------|----------------------|--------------------|--------------------|----------------------|--------------------|
|        | % Exact Agreement | % Adjacent Agreement | % Exact + Adjacent | % Exact Agreement  | % Adjacent Agreement | % Exact + Adjacent |
| 1      | 90                | 10                   | 100                | 86                 | 14                   | 100                |
| 2      | 88                | 12                   | 100                | 87                 | 13                   | 100                |

## Appendix N: 2009 Grade 12 Fall Mathematics Retest Raw-to-Scaled Score Conversion Table

| Raw Score | Measure | Measure SE | Scaled Score | Scaled Score SE | Freq. | Freq. % | Cum. Freq. | Cum. Freq. % | Percentile |
|-----------|---------|------------|--------------|-----------------|-------|---------|------------|--------------|------------|
| 0         | -5.8007 | 1.8313     | 700          | 378             | 0     | 0.0     | 0          | 0.0          | 0          |
| 1         | -4.5825 | 1.0101     | 700          | 209             | 2     | 0.0     | 2          | 0.0          | 1          |
| 2         | -3.8690 | 0.7214     | 700          | 149             | 2     | 0.0     | 4          | 0.0          | 1          |
| 3         | -3.4430 | 0.5949     | 700          | 123             | 1     | 0.0     | 5          | 0.0          | 1          |
| 4         | -3.1347 | 0.5203     | 700          | 107             | 0     | 0.0     | 5          | 0.0          | 1          |
| 5         | -2.8907 | 0.4700     | 700          | 97              | 8     | 0.0     | 13         | 0.0          | 1          |
| 6         | -2.6874 | 0.4333     | 700          | 89              | 11    | 0.0     | 24         | 0.1          | 1          |
| 7         | -2.5121 | 0.4051     | 700          | 84              | 22    | 0.1     | 46         | 0.1          | 1          |
| 8         | -2.3571 | 0.3827     | 717          | 79              | 29    | 0.1     | 75         | 0.2          | 1          |
| 9         | -2.2178 | 0.3644     | 745          | 75              | 59    | 0.2     | 134        | 0.4          | 1          |
| 10        | -2.0906 | 0.3492     | 772          | 72              | 116   | 0.4     | 250        | 0.8          | 1          |
| 11        | -1.9732 | 0.3363     | 796          | 69              | 195   | 0.6     | 445        | 1.4          | 1          |
| 12        | -1.8639 | 0.3252     | 818          | 67              | 266   | 0.8     | 711        | 2.2          | 2          |
| 13        | -1.7613 | 0.3156     | 840          | 65              | 346   | 1.1     | 1057       | 3.3          | 3          |
| 14        | -1.6644 | 0.3072     | 860          | 63              | 458   | 1.4     | 1515       | 4.7          | 4          |
| 15        | -1.5724 | 0.2998     | 879          | 62              | 575   | 1.8     | 2090       | 6.4          | 6          |
| 16        | -1.4844 | 0.2933     | 897          | 61              | 635   | 2.0     | 2725       | 8.4          | 7          |
| 17        | -1.4001 | 0.2876     | 914          | 59              | 675   | 2.1     | 3400       | 10.5         | 9          |
| 18        | -1.3189 | 0.2824     | 931          | 58              | 758   | 2.3     | 4158       | 12.8         | 12         |
| 19        | -1.2404 | 0.2779     | 947          | 57              | 751   | 2.3     | 4909       | 15.1         | 14         |
| 20        | -1.1644 | 0.2738     | 963          | 57              | 732   | 2.3     | 5641       | 17.4         | 16         |
| 21        | -1.0904 | 0.2702     | 978          | 56              | 740   | 2.3     | 6381       | 19.7         | 19         |
| 22        | -1.0183 | 0.2669     | 993          | 55              | 722   | 2.2     | 7103       | 21.9         | 21         |
| 23        | -0.9479 | 0.2640     | 1007         | 54              | 813   | 2.5     | 7916       | 24.4         | 23         |
| 24        | -0.8788 | 0.2615     | 1022         | 54              | 744   | 2.3     | 8660       | 26.7         | 26         |
| 25        | -0.8111 | 0.2592     | 1036         | 54              | 794   | 2.4     | 9454       | 29.1         | 28         |
| 26        | -0.7444 | 0.2572     | 1049         | 53              | 783   | 2.4     | 10237      | 31.6         | 30         |
| 27        | -0.6787 | 0.2555     | 1063         | 53              | 787   | 2.4     | 11024      | 34.0         | 33         |
| 28        | -0.6138 | 0.2540     | 1076         | 52              | 853   | 2.6     | 11877      | 36.6         | 35         |
| 29        | -0.5496 | 0.2528     | 1090         | 52              | 824   | 2.5     | 12701      | 39.2         | 38         |
| 30        | -0.4860 | 0.2517     | 1103         | 52              | 820   | 2.5     | 13521      | 41.7         | 40         |
| 31        | -0.4228 | 0.2509     | 1116         | 52              | 921   | 2.8     | 14442      | 44.5         | 43         |
| 32        | -0.3600 | 0.2502     | 1129         | 52              | 899   | 2.8     | 15341      | 47.3         | 46         |
| 33        | -0.2976 | 0.2497     | 1142         | 52              | 930   | 2.9     | 16271      | 50.2         | 49         |
| 34        | -0.2353 | 0.2494     | 1155         | 51              | 957   | 3.0     | 17228      | 53.1         | 52         |
| 35        | -0.1731 | 0.2493     | 1167         | 51              | 983   | 3.0     | 18211      | 56.1         | 55         |
| 36        | -0.1110 | 0.2493     | 1180         | 51              | 970   | 3.0     | 19181      | 59.1         | 58         |
| 37        | -0.0488 | 0.2495     | 1193         | 52              | 1009  | 3.1     | 20190      | 62.2         | 61         |
| 38        | 0.0136  | 0.2499     | 1206         | 52              | 935   | 2.9     | 21125      | 65.1         | 64         |
| 39        | 0.0761  | 0.2504     | 1219         | 52              | 988   | 3.0     | 22113      | 68.2         | 67         |
| 40        | 0.1390  | 0.2511     | 1232         | 52              | 914   | 2.8     | 23027      | 71.0         | 70         |
| 41        | 0.2022  | 0.2519     | 1245         | 52              | 943   | 2.9     | 23970      | 73.9         | 72         |
| 42        | 0.2659  | 0.2529     | 1258         | 52              | 926   | 2.9     | 24896      | 76.7         | 75         |
| 43        | 0.3302  | 0.2541     | 1271         | 52              | 875   | 2.7     | 25771      | 79.4         | 78         |
| 44        | 0.3951  | 0.2554     | 1285         | 53              | 817   | 2.5     | 26588      | 82.0         | 81         |
| 45        | 0.4607  | 0.2570     | 1298         | 53              | 786   | 2.4     | 27374      | 84.4         | 83         |
| 46        | 0.5272  | 0.2587     | 1312         | 53              | 763   | 2.4     | 28137      | 86.7         | 86         |
| 47        | 0.5946  | 0.2606     | 1326         | 54              | 680   | 2.1     | 28817      | 88.8         | 88         |
| 48        | 0.6631  | 0.2628     | 1340         | 54              | 568   | 1.8     | 29385      | 90.6         | 90         |
| 49        | 0.7328  | 0.2652     | 1354         | 55              | 575   | 1.8     | 29960      | 92.4         | 91         |
| 50        | 0.8037  | 0.2679     | 1369         | 55              | 459   | 1.4     | 30419      | 93.8         | 93         |

**2009 PSSA Grade 12 Retest Technical Report for Mathematics, Reading, Science, and Writing**

| <b>Raw Score</b> | <b>Measure</b> | <b>Measure SE</b> | <b>Scaled Score</b> | <b>Scaled Score SE</b> | <b>Freq.</b> | <b>Freq. %</b> | <b>Cum. Freq.</b> | <b>Cum. Freq. %</b> | <b>Percentile</b> |
|------------------|----------------|-------------------|---------------------|------------------------|--------------|----------------|-------------------|---------------------|-------------------|
| 51               | 0.8763         | 0.2708            | 1384                | 56                     | 405          | 1.2            | 30824             | 95.0                | 94                |
| 52               | 0.9505         | 0.2742            | 1399                | 57                     | 362          | 1.1            | 31186             | 96.1                | 96                |
| 53               | 1.0267         | 0.2778            | 1415                | 57                     | 269          | 0.8            | 31455             | 97.0                | 97                |
| 54               | 1.1050         | 0.2819            | 1431                | 58                     | 236          | 0.7            | 31691             | 97.7                | 97                |
| 55               | 1.1858         | 0.2866            | 1448                | 59                     | 167          | 0.5            | 31858             | 98.2                | 98                |
| 56               | 1.2694         | 0.2918            | 1465                | 60                     | 131          | 0.4            | 31989             | 98.6                | 98                |
| 57               | 1.3562         | 0.2976            | 1483                | 61                     | 117          | 0.4            | 32106             | 99.0                | 99                |
| 58               | 1.4467         | 0.3044            | 1502                | 63                     | 96           | 0.3            | 32202             | 99.3                | 99                |
| 59               | 1.5417         | 0.3121            | 1521                | 64                     | 52           | 0.2            | 32254             | 99.4                | 99                |
| 60               | 1.6418         | 0.3210            | 1542                | 66                     | 52           | 0.2            | 32306             | 99.6                | 99                |
| 61               | 1.7482         | 0.3315            | 1564                | 68                     | 34           | 0.1            | 32340             | 99.7                | 99                |
| 62               | 1.8621         | 0.3439            | 1587                | 71                     | 26           | 0.1            | 32366             | 99.8                | 99                |
| 63               | 1.9854         | 0.3587            | 1613                | 74                     | 21           | 0.1            | 32387             | 99.8                | 99                |
| 64               | 2.1204         | 0.3768            | 1641                | 78                     | 9            | 0.0            | 32396             | 99.9                | 99                |
| 65               | 2.2707         | 0.3993            | 1672                | 82                     | 7            | 0.0            | 32403             | 99.9                | 99                |
| 66               | 2.4413         | 0.4278            | 1707                | 88                     | 11           | 0.0            | 32414             | 99.9                | 99                |
| 67               | 2.6399         | 0.4652            | 1748                | 96                     | 7            | 0.0            | 32421             | 99.9                | 99                |
| 68               | 2.8796         | 0.5165            | 1798                | 107                    | 6            | 0.0            | 32427             | 100.0               | 99                |
| 69               | 3.1846         | 0.5926            | 1860                | 122                    | 5            | 0.0            | 32432             | 100.0               | 99                |
| 70               | 3.6086         | 0.7208            | 1948                | 149                    | 6            | 0.0            | 32438             | 100.0               | 99                |
| 71               | 4.3226         | 1.0111            | 2095                | 209                    | 0            | 0.0            | 32438             | 100.0               | 100               |
| 72               | 5.5430         | 1.8326            | 2347                | 378                    | 0            | 0.0            | 32438             | 100.0               | 100               |

**Appendix O: 2009 Grade 12 Fall Reading Retest  
Raw-to-Scaled Score Conversion Table**

| Raw Score | Measure | Measure SE | Scaled Score | Scaled Score SE | Freq. | Freq. % | Cum. Freq. | Cum. Freq. % | Percentile |
|-----------|---------|------------|--------------|-----------------|-------|---------|------------|--------------|------------|
| 0         | -5.4866 | 1.8337     | 700          | 450             | 1     | 0.0     | 1          | 0.0          | 1          |
| 1         | -4.2621 | 1.0147     | 700          | 249             | 0     | 0.0     | 1          | 0.0          | 1          |
| 2         | -3.5392 | 0.7279     | 700          | 179             | 1     | 0.0     | 2          | 0.0          | 1          |
| 3         | -3.1037 | 0.6030     | 700          | 148             | 1     | 0.0     | 3          | 0.0          | 1          |
| 4         | -2.7856 | 0.5298     | 700          | 130             | 9     | 0.0     | 12         | 0.0          | 1          |
| 5         | -2.5315 | 0.4808     | 700          | 118             | 14    | 0.1     | 26         | 0.1          | 1          |
| 6         | -2.3177 | 0.4454     | 700          | 109             | 28    | 0.1     | 54         | 0.2          | 1          |
| 7         | -2.1316 | 0.4185     | 700          | 103             | 68    | 0.3     | 122        | 0.5          | 1          |
| 8         | -1.9655 | 0.3974     | 700          | 98              | 94    | 0.4     | 216        | 0.9          | 1          |
| 9         | -1.8144 | 0.3805     | 700          | 93              | 188   | 0.8     | 404        | 1.7          | 1          |
| 10        | -1.6749 | 0.3666     | 704          | 90              | 259   | 1.1     | 663        | 2.7          | 2          |
| 11        | -1.5448 | 0.3552     | 736          | 87              | 325   | 1.3     | 988        | 4.1          | 3          |
| 12        | -1.4221 | 0.3456     | 766          | 85              | 397   | 1.6     | 1385       | 5.7          | 5          |
| 13        | -1.3054 | 0.3376     | 795          | 83              | 394   | 1.6     | 1779       | 7.3          | 7          |
| 14        | -1.1938 | 0.3309     | 822          | 81              | 473   | 1.9     | 2252       | 9.3          | 8          |
| 15        | -1.0863 | 0.3252     | 849          | 80              | 522   | 2.1     | 2774       | 11.4         | 10         |
| 16        | -0.9821 | 0.3205     | 874          | 79              | 501   | 2.1     | 3275       | 13.5         | 12         |
| 17        | -0.8806 | 0.3165     | 899          | 78              | 555   | 2.3     | 3830       | 15.7         | 15         |
| 18        | -0.7815 | 0.3133     | 923          | 77              | 568   | 2.3     | 4398       | 18.1         | 17         |
| 19        | -0.6842 | 0.3107     | 947          | 76              | 671   | 2.8     | 5069       | 20.8         | 19         |
| 20        | -0.5884 | 0.3086     | 971          | 76              | 633   | 2.6     | 5702       | 23.4         | 22         |
| 21        | -0.4936 | 0.3071     | 994          | 75              | 788   | 3.2     | 6490       | 26.7         | 25         |
| 22        | -0.3996 | 0.3060     | 1017         | 75              | 717   | 2.9     | 7207       | 29.6         | 28         |
| 23        | -0.3062 | 0.3054     | 1040         | 75              | 865   | 3.6     | 8072       | 33.2         | 31         |
| 24        | -0.2130 | 0.3052     | 1063         | 75              | 894   | 3.7     | 8966       | 36.9         | 35         |
| 25        | -0.1198 | 0.3054     | 1086         | 75              | 984   | 4.0     | 9950       | 40.9         | 39         |
| 26        | -0.0264 | 0.3059     | 1109         | 75              | 1015  | 4.2     | 10965      | 45.1         | 43         |
| 27        | 0.0675  | 0.3069     | 1132         | 75              | 1086  | 4.5     | 12051      | 49.5         | 47         |
| 28        | 0.1621  | 0.3082     | 1155         | 76              | 1154  | 4.7     | 13205      | 54.3         | 52         |
| 29        | 0.2575  | 0.3099     | 1178         | 76              | 1136  | 4.7     | 14341      | 58.9         | 57         |
| 30        | 0.3542  | 0.3120     | 1202         | 77              | 1164  | 4.8     | 15505      | 63.7         | 61         |
| 31        | 0.4523  | 0.3145     | 1226         | 77              | 1159  | 4.8     | 16664      | 68.5         | 66         |
| 32        | 0.5521  | 0.3175     | 1251         | 78              | 1134  | 4.7     | 17798      | 73.2         | 71         |
| 33        | 0.6540  | 0.3209     | 1276         | 79              | 1086  | 4.5     | 18884      | 77.6         | 75         |
| 34        | 0.7582  | 0.3248     | 1301         | 80              | 995   | 4.1     | 19879      | 81.7         | 80         |
| 35        | 0.8652  | 0.3294     | 1328         | 81              | 842   | 3.5     | 20721      | 85.2         | 83         |
| 36        | 0.9754  | 0.3345     | 1355         | 82              | 814   | 3.3     | 21535      | 88.5         | 87         |
| 37        | 1.0892  | 0.3404     | 1383         | 84              | 665   | 2.7     | 22200      | 91.2         | 90         |
| 38        | 1.2073  | 0.3472     | 1412         | 85              | 544   | 2.2     | 22744      | 93.5         | 92         |
| 39        | 1.3305  | 0.3550     | 1442         | 87              | 461   | 1.9     | 23205      | 95.4         | 94         |
| 40        | 1.4597  | 0.3639     | 1473         | 89              | 343   | 1.4     | 23548      | 96.8         | 96         |
| 41        | 1.5958  | 0.3743     | 1507         | 92              | 243   | 1.0     | 23791      | 97.8         | 97         |
| 42        | 1.7403  | 0.3864     | 1542         | 95              | 174   | 0.7     | 23965      | 98.5         | 98         |
| 43        | 1.8951  | 0.4007     | 1580         | 98              | 128   | 0.5     | 24093      | 99.0         | 99         |
| 44        | 2.0624  | 0.4180     | 1621         | 103             | 86    | 0.4     | 24179      | 99.4         | 99         |
| 45        | 2.2459  | 0.4392     | 1666         | 108             | 39    | 0.2     | 24218      | 99.5         | 99         |
| 46        | 2.4502  | 0.4659     | 1717         | 114             | 41    | 0.2     | 24259      | 99.7         | 99         |
| 47        | 2.6831  | 0.5007     | 1774         | 123             | 28    | 0.1     | 24287      | 99.8         | 99         |
| 48        | 2.9572  | 0.5488     | 1841         | 135             | 15    | 0.1     | 24302      | 99.9         | 99         |
| 49        | 3.2962  | 0.6204     | 1924         | 152             | 16    | 0.1     | 24318      | 100.0        | 99         |
| 50        | 3.7534  | 0.7429     | 2036         | 182             | 5     | 0.0     | 24323      | 100.0        | 99         |

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| <b>Raw Score</b> | <b>Measure</b> | <b>Measure SE</b> | <b>Scaled Score</b> | <b>Scaled Score SE</b> | <b>Freq.</b> | <b>Freq. %</b> | <b>Cum. Freq.</b> | <b>Cum. Freq. %</b> | <b>Percentile</b> |
|------------------|----------------|-------------------|---------------------|------------------------|--------------|----------------|-------------------|---------------------|-------------------|
| 51               | 4.4985         | 1.0258            | 2219                | 252                    | 5            | 0.0            | 24328             | 100.0               | 99                |
| 52               | 5.7391         | 1.8400            | 2524                | 452                    | 1            | 0.0            | 24329             | 100.0               | 99                |



## Appendix P: 2009 Grade 12 Fall Science Retest Raw-to-Scaled Score Conversion Table

| Raw Score | Measure | Measure SE | Scaled Score | Scaled Score SE | Freq. | Freq. % | Cum. Freq. | Cum. Freq. % | Percentile |
|-----------|---------|------------|--------------|-----------------|-------|---------|------------|--------------|------------|
| 0         | -5.8577 | 1.8355     | 1050         | 187             | 0     | 0.0     | 0          | 0.0          | 0          |
| 1         | -4.6285 | 1.0178     | 1050         | 104             | 0     | 0.0     | 0          | 0.0          | 0          |
| 2         | -3.8994 | 0.7321     | 1050         | 75              | 0     | 0.0     | 0          | 0.0          | 0          |
| 3         | -3.4581 | 0.6076     | 1050         | 62              | 0     | 0.0     | 0          | 0.0          | 0          |
| 4         | -3.1346 | 0.5346     | 1050         | 54              | 1     | 0.0     | 1          | 0.0          | 1          |
| 5         | -2.8757 | 0.4855     | 1050         | 49              | 3     | 0.0     | 4          | 0.0          | 1          |
| 6         | -2.6577 | 0.4499     | 1050         | 46              | 7     | 0.0     | 11         | 0.0          | 1          |
| 7         | -2.4678 | 0.4226     | 1050         | 43              | 22    | 0.1     | 33         | 0.1          | 1          |
| 8         | -2.2985 | 0.4009     | 1050         | 41              | 30    | 0.1     | 63         | 0.2          | 1          |
| 9         | -2.1451 | 0.3832     | 1050         | 39              | 76    | 0.3     | 139        | 0.5          | 1          |
| 10        | -2.0039 | 0.3684     | 1050         | 38              | 126   | 0.5     | 265        | 1.0          | 1          |
| 11        | -1.8729 | 0.3559     | 1050         | 36              | 186   | 0.7     | 451        | 1.7          | 1          |
| 12        | -1.7501 | 0.3452     | 1050         | 35              | 258   | 1.0     | 709        | 2.7          | 2          |
| 13        | -1.6342 | 0.3358     | 1050         | 34              | 313   | 1.2     | 1022       | 3.9          | 3          |
| 14        | -1.5242 | 0.3276     | 1050         | 33              | 407   | 1.6     | 1429       | 5.4          | 5          |
| 15        | -1.4193 | 0.3204     | 1050         | 33              | 440   | 1.7     | 1869       | 7.1          | 6          |
| 16        | -1.3187 | 0.3140     | 1060         | 32              | 496   | 1.9     | 2365       | 9.0          | 8          |
| 17        | -1.2220 | 0.3082     | 1070         | 31              | 513   | 2.0     | 2878       | 11.0         | 10         |
| 18        | -1.1286 | 0.3031     | 1080         | 31              | 595   | 2.3     | 3473       | 13.2         | 12         |
| 19        | -1.0381 | 0.2984     | 1089         | 30              | 596   | 2.3     | 4069       | 15.5         | 14         |
| 20        | -0.9504 | 0.2942     | 1098         | 30              | 611   | 2.3     | 4680       | 17.8         | 17         |
| 21        | -0.8650 | 0.2904     | 1107         | 30              | 644   | 2.5     | 5324       | 20.3         | 19         |
| 22        | -0.7816 | 0.2869     | 1115         | 29              | 683   | 2.6     | 6007       | 22.9         | 22         |
| 23        | -0.7002 | 0.2838     | 1123         | 29              | 736   | 2.8     | 6743       | 25.7         | 24         |
| 24        | -0.6205 | 0.2810     | 1132         | 29              | 778   | 3.0     | 7521       | 28.7         | 27         |
| 25        | -0.5423 | 0.2784     | 1139         | 28              | 702   | 2.7     | 8223       | 31.3         | 30         |
| 26        | -0.4654 | 0.2761     | 1147         | 28              | 738   | 2.8     | 8961       | 34.1         | 33         |
| 27        | -0.3898 | 0.2740     | 1155         | 28              | 809   | 3.1     | 9770       | 37.2         | 36         |
| 28        | -0.3153 | 0.2721     | 1163         | 28              | 757   | 2.9     | 10527      | 40.1         | 39         |
| 29        | -0.2416 | 0.2704     | 1170         | 28              | 848   | 3.2     | 11375      | 43.3         | 42         |
| 30        | -0.1689 | 0.2690     | 1177         | 27              | 829   | 3.2     | 12204      | 46.5         | 45         |
| 31        | -0.0969 | 0.2677     | 1185         | 27              | 799   | 3.0     | 13003      | 49.6         | 48         |
| 32        | -0.0256 | 0.2666     | 1192         | 27              | 853   | 3.3     | 13856      | 52.8         | 51         |
| 33        | 0.0452  | 0.2656     | 1199         | 27              | 859   | 3.3     | 14715      | 56.1         | 54         |
| 34        | 0.1156  | 0.2649     | 1206         | 27              | 838   | 3.2     | 15553      | 59.3         | 58         |
| 35        | 0.1856  | 0.2643     | 1214         | 27              | 895   | 3.4     | 16448      | 62.7         | 61         |
| 36        | 0.2553  | 0.2639     | 1221         | 27              | 891   | 3.4     | 17339      | 66.1         | 64         |
| 37        | 0.3248  | 0.2636     | 1228         | 27              | 904   | 3.4     | 18243      | 69.5         | 68         |
| 38        | 0.3943  | 0.2635     | 1235         | 27              | 827   | 3.2     | 19070      | 72.7         | 71         |
| 39        | 0.4638  | 0.2636     | 1242         | 27              | 851   | 3.2     | 19921      | 75.9         | 74         |
| 40        | 0.5333  | 0.2639     | 1249         | 27              | 793   | 3.0     | 20714      | 78.9         | 77         |
| 41        | 0.6030  | 0.2643     | 1256         | 27              | 714   | 2.7     | 21428      | 81.7         | 80         |
| 42        | 0.6731  | 0.2650     | 1263         | 27              | 750   | 2.9     | 22178      | 84.5         | 83         |
| 43        | 0.7435  | 0.2658     | 1270         | 27              | 639   | 2.4     | 22817      | 87.0         | 86         |
| 44        | 0.8144  | 0.2669     | 1278         | 27              | 594   | 2.3     | 23411      | 89.2         | 88         |
| 45        | 0.8860  | 0.2681     | 1285         | 27              | 525   | 2.0     | 23936      | 91.2         | 90         |
| 46        | 0.9582  | 0.2696     | 1292         | 27              | 457   | 1.7     | 24393      | 93.0         | 92         |
| 47        | 1.0314  | 0.2713     | 1300         | 28              | 412   | 1.6     | 24805      | 94.5         | 94         |
| 48        | 1.1055  | 0.2733     | 1307         | 28              | 354   | 1.3     | 25159      | 95.9         | 95         |
| 49        | 1.1808  | 0.2755     | 1315         | 28              | 246   | 0.9     | 25405      | 96.8         | 96         |
| 50        | 1.2573  | 0.2780     | 1323         | 28              | 216   | 0.8     | 25621      | 97.6         | 97         |

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| Raw Score | Measure | Measure SE | Scaled Score | Scaled Score SE | Freq. | Freq. % | Cum. Freq. | Cum. Freq. % | Percentile |
|-----------|---------|------------|--------------|-----------------|-------|---------|------------|--------------|------------|
| 51        | 1.3354  | 0.2808     | 1331         | 29              | 151   | 0.6     | 25772      | 98.2         | 98         |
| 52        | 1.4151  | 0.2839     | 1339         | 29              | 145   | 0.6     | 25917      | 98.8         | 98         |
| 53        | 1.4967  | 0.2873     | 1347         | 29              | 82    | 0.3     | 25999      | 99.1         | 99         |
| 54        | 1.5803  | 0.2912     | 1356         | 30              | 67    | 0.3     | 26066      | 99.3         | 99         |
| 55        | 1.6663  | 0.2954     | 1364         | 30              | 50    | 0.2     | 26116      | 99.5         | 99         |
| 56        | 1.7550  | 0.3001     | 1373         | 31              | 41    | 0.2     | 26157      | 99.7         | 99         |
| 57        | 1.8465  | 0.3053     | 1383         | 31              | 19    | 0.1     | 26176      | 99.8         | 99         |
| 58        | 1.9414  | 0.3110     | 1392         | 32              | 21    | 0.1     | 26197      | 99.8         | 99         |
| 59        | 2.0401  | 0.3175     | 1402         | 32              | 9     | 0.0     | 26206      | 99.9         | 99         |
| 60        | 2.1432  | 0.3247     | 1413         | 33              | 6     | 0.0     | 26212      | 99.9         | 99         |
| 61        | 2.2513  | 0.3329     | 1424         | 34              | 6     | 0.0     | 26218      | 99.9         | 99         |
| 62        | 2.3652  | 0.3423     | 1435         | 35              | 4     | 0.0     | 26222      | 99.9         | 99         |
| 63        | 2.4861  | 0.3532     | 1448         | 36              | 5     | 0.0     | 26227      | 99.9         | 99         |
| 64        | 2.6153  | 0.3660     | 1461         | 37              | 2     | 0.0     | 26229      | 100.0        | 99         |
| 65        | 2.7547  | 0.3812     | 1475         | 39              | 5     | 0.0     | 26234      | 100.0        | 99         |
| 66        | 2.9069  | 0.3996     | 1491         | 41              | 3     | 0.0     | 26237      | 100.0        | 99         |
| 67        | 3.0755  | 0.4223     | 1508         | 43              | 3     | 0.0     | 26240      | 100.0        | 99         |
| 68        | 3.2656  | 0.4510     | 1527         | 46              | 1     | 0.0     | 26241      | 100.0        | 99         |
| 69        | 3.4855  | 0.4884     | 1550         | 50              | 0     | 0.0     | 26241      | 100.0        | 100        |
| 70        | 3.7485  | 0.5396     | 1576         | 55              | 0     | 0.0     | 26241      | 100.0        | 100        |
| 71        | 4.0791  | 0.6150     | 1610         | 63              | 0     | 0.0     | 26241      | 100.0        | 100        |
| 72        | 4.5317  | 0.7414     | 1656         | 75              | 0     | 0.0     | 26241      | 100.0        | 100        |
| 73        | 5.2775  | 1.0276     | 1732         | 105             | 0     | 0.0     | 26241      | 100.0        | 100        |
| 74        | 6.5224  | 1.8424     | 1859         | 188             | 0     | 0.0     | 26241      | 100.0        | 100        |

**Appendix Q: 2009 Grade 12 Fall Writing Retest  
Raw-to-Scaled Score Conversion Table**

| Raw Score | Measure | Measure SE | Scaled Score | Scaled Score SE | Freq. | Freq. % | Cum. Freq. | Cum. Freq. % | Percentile |
|-----------|---------|------------|--------------|-----------------|-------|---------|------------|--------------|------------|
| 22        | -7.8865 | 1.8373     | 700          | 184             | 7     | 0.1     | 7          | 0.1          | 1          |
| 23        | -6.6524 | 1.0216     | 700          | 102             | 22    | 0.2     | 29         | 0.3          | 1          |
| 24        | -5.9148 | 0.7384     | 700          | 74              | 56    | 0.6     | 85         | 1.0          | 1          |
| 25        | -5.4632 | 0.6168     | 700          | 62              | 93    | 1.1     | 178        | 2.0          | 1          |
| 26        | -5.1275 | 0.5469     | 732          | 55              | 105   | 1.2     | 283        | 3.2          | 3          |
| 27        | -4.8542 | 0.5012     | 759          | 50              | 85    | 1.0     | 368        | 4.2          | 4          |
| 28        | -4.6196 | 0.4692     | 782          | 47              | 80    | 0.9     | 448        | 5.1          | 5          |
| 29        | -4.4108 | 0.4458     | 803          | 45              | 50    | 0.6     | 498        | 5.6          | 5          |
| 30        | -4.2201 | 0.4283     | 822          | 43              | 39    | 0.4     | 537        | 6.1          | 6          |
| 31        | -4.0425 | 0.4152     | 840          | 42              | 25    | 0.3     | 562        | 6.4          | 6          |
| 32        | -3.8743 | 0.4053     | 857          | 41              | 23    | 0.3     | 585        | 6.6          | 6          |
| 33        | -3.7132 | 0.3979     | 873          | 40              | 17    | 0.2     | 602        | 6.8          | 7          |
| 34        | -3.5571 | 0.3926     | 889          | 39              | 28    | 0.3     | 630        | 7.1          | 7          |
| 35        | -3.4044 | 0.3890     | 904          | 39              | 90    | 1.0     | 720        | 8.1          | 8          |
| 36        | -3.2542 | 0.3866     | 919          | 39              | 114   | 1.3     | 834        | 9.4          | 9          |
| 37        | -3.1053 | 0.3853     | 934          | 39              | 161   | 1.8     | 995        | 11.3         | 10         |
| 38        | -2.9570 | 0.3847     | 949          | 38              | 154   | 1.7     | 1149       | 13.0         | 12         |
| 39        | -2.8091 | 0.3846     | 963          | 38              | 167   | 1.9     | 1316       | 14.9         | 14         |
| 40        | -2.6611 | 0.3848     | 978          | 38              | 127   | 1.4     | 1443       | 16.3         | 16         |
| 41        | -2.5130 | 0.3848     | 993          | 38              | 133   | 1.5     | 1576       | 17.8         | 17         |
| 42        | -2.3650 | 0.3845     | 1008         | 38              | 120   | 1.4     | 1696       | 19.2         | 19         |
| 43        | -2.2174 | 0.3837     | 1023         | 38              | 82    | 0.9     | 1778       | 20.1         | 20         |
| 44        | -2.0708 | 0.3821     | 1037         | 38              | 79    | 0.9     | 1857       | 21.0         | 21         |
| 45        | -1.9256 | 0.3797     | 1052         | 38              | 85    | 1.0     | 1942       | 22.0         | 21         |
| 46        | -1.7826 | 0.3766     | 1066         | 38              | 173   | 2.0     | 2115       | 23.9         | 23         |
| 47        | -1.6421 | 0.3729     | 1080         | 37              | 242   | 2.7     | 2357       | 26.7         | 25         |
| 48        | -1.5045 | 0.3688     | 1094         | 37              | 305   | 3.5     | 2662       | 30.1         | 28         |
| 49        | -1.3701 | 0.3644     | 1107         | 36              | 398   | 4.5     | 3060       | 34.6         | 32         |
| 50        | -1.2390 | 0.3600     | 1120         | 36              | 441   | 5.0     | 3501       | 39.6         | 37         |
| 51        | -1.1110 | 0.3556     | 1133         | 36              | 460   | 5.2     | 3961       | 44.8         | 42         |
| 52        | -0.9860 | 0.3516     | 1146         | 35              | 458   | 5.2     | 4419       | 50.0         | 47         |
| 53        | -0.8636 | 0.3479     | 1158         | 35              | 369   | 4.2     | 4788       | 54.2         | 52         |
| 54        | -0.7437 | 0.3448     | 1170         | 34              | 310   | 3.5     | 5098       | 57.7         | 56         |
| 55        | -0.6258 | 0.3421     | 1182         | 34              | 222   | 2.5     | 5320       | 60.2         | 59         |
| 56        | -0.5095 | 0.3401     | 1193         | 34              | 125   | 1.4     | 5445       | 61.6         | 61         |
| 57        | -0.3943 | 0.3386     | 1205         | 34              | 102   | 1.2     | 5547       | 62.7         | 62         |
| 58        | -0.2800 | 0.3379     | 1216         | 34              | 104   | 1.2     | 5651       | 63.9         | 63         |
| 59        | -0.1658 | 0.3379     | 1228         | 34              | 104   | 1.2     | 5755       | 65.1         | 65         |
| 60        | -0.0515 | 0.3386     | 1239         | 34              | 134   | 1.5     | 5889       | 66.6         | 66         |
| 61        | 0.0636  | 0.3401     | 1251         | 34              | 159   | 1.8     | 6048       | 68.4         | 68         |
| 62        | 0.1801  | 0.3424     | 1262         | 34              | 220   | 2.5     | 6268       | 70.9         | 70         |
| 63        | 0.2984  | 0.3457     | 1274         | 35              | 255   | 2.9     | 6523       | 73.8         | 72         |
| 64        | 0.4193  | 0.3500     | 1286         | 35              | 250   | 2.8     | 6773       | 76.6         | 75         |
| 65        | 0.5437  | 0.3555     | 1299         | 36              | 271   | 3.1     | 7044       | 79.7         | 78         |
| 66        | 0.6724  | 0.3622     | 1312         | 36              | 212   | 2.4     | 7256       | 82.1         | 81         |
| 67        | 0.8065  | 0.3704     | 1325         | 37              | 126   | 1.4     | 7382       | 83.5         | 83         |
| 68        | 0.9472  | 0.3802     | 1339         | 38              | 63    | 0.7     | 7445       | 84.2         | 84         |
| 69        | 1.0962  | 0.3921     | 1354         | 39              | 43    | 0.5     | 7488       | 84.7         | 84         |
| 70        | 1.2554  | 0.4062     | 1370         | 41              | 51    | 0.6     | 7539       | 85.3         | 85         |
| 71        | 1.4272  | 0.4231     | 1387         | 42              | 78    | 0.9     | 7617       | 86.2         | 86         |

**2009 PSSA Grade 12 Retest Technical Report for Mathematics, Reading, Science, and Writing**

| Raw Score | Measure | Measure SE | Scaled Score | Scaled Score SE | Freq. | Freq. % | Cum. Freq. | Cum. Freq. % | Percentile |
|-----------|---------|------------|--------------|-----------------|-------|---------|------------|--------------|------------|
| 72        | 1.6146  | 0.4432     | 1406         | 44              | 85    | 1.0     | 7702       | 87.1         | 87         |
| 73        | 1.8214  | 0.4668     | 1426         | 47              | 114   | 1.3     | 7816       | 88.4         | 88         |
| 74        | 2.0520  | 0.4941     | 1450         | 49              | 160   | 1.8     | 7976       | 90.2         | 89         |
| 75        | 2.3110  | 0.5238     | 1475         | 52              | 184   | 2.1     | 8160       | 92.3         | 91         |
| 76        | 2.6012  | 0.5528     | 1504         | 55              | 203   | 2.3     | 8363       | 94.6         | 93         |
| 77        | 2.9198  | 0.5742     | 1536         | 57              | 196   | 2.2     | 8559       | 96.8         | 96         |
| 78        | 3.2547  | 0.5802     | 1570         | 58              | 113   | 1.3     | 8672       | 98.1         | 97         |
| 79        | 3.5862  | 0.5686     | 1603         | 57              | 23    | 0.3     | 8695       | 98.4         | 98         |
| 80        | 3.8972  | 0.5455     | 1634         | 55              | 3     | 0.0     | 8698       | 98.4         | 98         |
| 81        | 4.1805  | 0.5189     | 1662         | 52              | 1     | 0.0     | 8699       | 98.4         | 98         |
| 82        | 4.4369  | 0.4942     | 1688         | 49              | 2     | 0.0     | 8701       | 98.4         | 98         |
| 83        | 4.6705  | 0.4732     | 1711         | 47              | 5     | 0.1     | 8706       | 98.5         | 98         |
| 84        | 4.8862  | 0.4564     | 1733         | 46              | 9     | 0.1     | 8715       | 98.6         | 99         |
| 85        | 5.0884  | 0.4435     | 1753         | 44              | 15    | 0.2     | 8730       | 98.8         | 99         |
| 86        | 5.2807  | 0.4341     | 1772         | 43              | 13    | 0.1     | 8743       | 98.9         | 99         |
| 87        | 5.4663  | 0.4280     | 1791         | 43              | 33    | 0.4     | 8776       | 99.3         | 99         |
| 88        | 5.6480  | 0.4250     | 1809         | 43              | 19    | 0.2     | 8795       | 99.5         | 99         |
| 89        | 5.8284  | 0.4249     | 1827         | 42              | 18    | 0.2     | 8813       | 99.7         | 99         |
| 90        | 6.0100  | 0.4279     | 1845         | 43              | 4     | 0.0     | 8817       | 99.7         | 99         |
| 91        | 6.1955  | 0.4342     | 1864         | 43              | 0     | 0.0     | 8817       | 99.7         | 99         |
| 92        | 6.3882  | 0.4444     | 1883         | 44              | 0     | 0.0     | 8817       | 99.7         | 99         |
| 93        | 6.5920  | 0.4594     | 1904         | 46              | 0     | 0.0     | 8817       | 99.7         | 99         |
| 94        | 6.8124  | 0.4806     | 1926         | 48              | 1     | 0.0     | 8818       | 99.8         | 99         |
| 95        | 7.0573  | 0.5108     | 1950         | 51              | 0     | 0.0     | 8818       | 99.8         | 99         |
| 96        | 7.3398  | 0.5548     | 1978         | 55              | 0     | 0.0     | 8818       | 99.8         | 99         |
| 97        | 7.6838  | 0.6232     | 2013         | 62              | 1     | 0.0     | 8819       | 99.8         | 99         |
| 98        | 8.1431  | 0.7433     | 2059         | 74              | 4     | 0.0     | 8823       | 99.8         | 99         |
| 99        | 8.8876  | 1.0248     | 2133         | 102             | 6     | 0.1     | 8829       | 99.9         | 99         |
| 100       | 10.1262 | 1.8390     | 2257         | 184             | 11    | 0.1     | 8840       | 100.0        | 99         |